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THE AMPHIPODA OF THE MADRAS COAST

BY

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THE AMPHIPODA OF THE MADRAS COAST*

By K. NAGAPPAN NAYAR, M.Sc. †

INTRODUCTION.

Our knowledge of the amphipoda is based on the work of a very large number of authors, dating from 1816. Of the many who have contributed to the knowledge of the taxonomy of the amphipods, Dana (1853–1895), Della Valle (1893), Stephensen (1912, 1915, 1925 and 1935), Pirlot (1929, 1930, 1932 and 1939), Barnard (1916, 1925, 1930 and 1940), Shoemaker (1920, 1921, 1935, 1945 and 1949) and Schellenberg (1926, 1928, 1938 and 1942) may be mentioned here, though there are other authors such as Mayer (1881 and 1903), Chevreux (1900 and 1908) and Tattersall (1912, 1914 and 1925) who have made brief references to isolated species.

Studies on the amphipods of the Indian and the neighbouring waters received the attention of Zoologists only as late as 1885 when Giles published a paper on the occurrence of two species of amphipods from Bengal. Subsequently in 1887, 1888 and 1890 he continued his work on amphipods and described about twenty-five more species from Indian waters bringing the total number of Indian amphipods to about twenty-seven out of which three species were recorded from the Madras Coast off the Seven Pagodas, Mahabalipuram. Stebbing in 1904 had the opportunity of describing two species of amphipods, which had been sent to him from Ceylon. Two more new species from the brackish ponds at port Canning, Lower Bengal have also been described by Stebbing in 1907 and 1908. In 1904 Walker published a report on the amphipods that were collected by Professor Herdman and Mr. Hornell off the coasts of Ceylon. This formed one of the outstanding works on the amphipods of the Indian waters. Later Stanley Gardiner's Expedition to the Maldives (1905) and the Percy Sladen Trust Expedition (1909a and 1909b) from the Indian Ocean provided Walker some very good material for three more valuable papers. Tattersall (1912) recorded a new semi terrestrial amphipoda in India for the first time. He followed it by another paper (1914) on the occurrence of a species of amphipod of the genus *Gammarus* found from a stagnant pool on summits of Killik Pass between Northern Hunza Range and the Taghdumkash Pamir at an altitude of 15,600 feet above sea level. Another record of the amphipod of the genus *Ampelisca* collected by Annandale from the river Ganges at Buxar, about 600 miles from the mouth of the river, was made by Chilton in 1920. A notable work by the same author appeared in 1921 after he had made a detailed study of about seventeen species of amphipods of the Chilka Lake. In 1923 again he had the chance of describing one more species of amphipod collected from a coal mine in Bengal by Annandale. The existence of the same species of amphipod in a seepage spring skeletonizing leaf debris

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at some other place in India was later pointed out by Stephenson (1931). Our knowledge of the amphipods of the Krusadai Island, Gulf of Manaar and the neighbouring waters is based on Gravely's (1927) and Sundara Raj's (1927) papers wherein they have just mentioned the sixteen different species of amphipods found in that area. The collection of the amphipods made from Travancore, Cochin and Bengal coasts by some of the members of the Zoological Survey of India have been worked out by Bernard (1935). Apart from the record of the three species of amphipods off the coast of Mahabalipuram by Giles (1888 and 1890) and a brief note about the occurrence of three species of amphipods at Adyar in Madras, by Panikkar and Aiyar (1937), in their study of the brackish water fauna of the Madras Coast, the amphipods of the Madras Coast have not been worked out to the knowledge of the author and hence formed the subject of this investigation.

The present study is based on the collections of the author made during a period of about two and a half years (1948–1950). A total of forty-one species have been recorded and described.

MATERIAL AND METHODS.

The present paper includes a study of all the amphipods collected from Madras harbour, Royapuram, Adyar backwaters, Cooum river, Madras inshore waters, Ennore, Mahabalipuram, Krusadai Islands and Tuticorin.

Though much care has been taken to include all the forms that have not been recorded from India previously, yet it must be admitted here that the collections made were only from the shore. Though regular dredge collections were made at the inshore waters, lack of facilities prevented any attempt of making deep sea collections. Hence it is fully realised that the present study is far from complete and with improved collecting methods more species and genera of Madras amphipod fauna may be added to the present study.

The majority of the forms described here were found clinging on the algae and as such those fronds of algae were taken and were washed and the amphipods were picked out from them. Most of the species were collected from different localities and often in large numbers. Most of them were of small size and in many cases the task of sorting them out and of identifying allied species was somewhat laborious.

During the course of this investigation, about 525 samples of inshore plankton collections were examined and seven species were obtained from them. The plankton collections were examined on the day of collection itself and the species of amphipods collected, preserved in 5 per cent formalin, and later examined. About forty dredge collections were examined and fourteen species were obtained from them. Dredge collections that were made during the course of this study were also examined on the day of collection, and the specimens were picked out and preserved as above.

As identification of species is mainly based on the size and shape of the various appendages, all the appendages of each species were drawn separately. In most of the cases all the appendages were drawn from the same specimen, usually a well developed male, dissecting it under a binocular-microscope and mounting the appendages each on a separate slide. The drawings were made by first dissecting the male because of the fact that in many cases the females were very difficult to identify—the females belonging to the different species resemble so closely that their identification is very difficult. In most of the cases the female differed from the male principally in the first and the second gnathopods, and so only those appendages in the female were drawn. Safranin was used to stain the appendages. All the drawings were made with the aid of camera lucida. In the style of description and the terminology used, the author has adhered to those used by Stebbing (1906).

A CLASSIFIED LIST OF THE AMPHIPODS OF THE MADRAS COAST.

Sub-order GAMMARIDEA.

Family LYSIANASSIDAE.

1 *Shoemakerellata nasuta* (Dana).
2 *Lepidepecreum foraminiferum* Stebbing.

Family AMPELISCIDAE.

3 *Ampelisca zamboangae* Stebbing.
4 *Ampelisca cyclops* Walker.
5 *Ampelisca tridens* Walker.
6 *Byblis lepta* (Giles).

Family HAUSTORIIDAE.

7 *Platyischnopus herdmani* Walker.
8 *Urothoë spinidigitus* Walker.

Family PHOXOCEPHALIDAE.

9 *Leptophoxus uncirostratus* (Giles).

Family AMPHILOCHIDAE.

10 *Cyproidea ornata* Haswell.

Family LEUCOTHOIDAE.

11 *Leucothoe spinicarpa* (Abildgaard).

Family STENOTHOIDAE.

12 *Stenothoe gallensis* Walker.

Family OEDICEROTIDAE.

13 *Perioculodes longimanus* (Bate and Westwood).

Family CALLIOPIIDAE.

14 *Paracalliope indica* Barnard.

Family GAMMARIDAE.

15 *Eriopisa chilkensis* (Chilton).
16 *Megaluropus agilis* Hoeck.
17 *Melita fresnalii* (Aud.).
18 *Maera quadrimana* (Dana).
19 *Maera pacifica* Schellenberg.
20 *Maera othonides* Walker.
21 *Quadrivisio bengalensis* Stebbing.
22 *Elasmopus pectenicrus* (Bate).

Family TALITRIDAE.

23 *Talorchestia martensii* (Weber).
24 *Hyale hawaiensis* (Dana).
25 *Hyale honoluluensis* Schellenberg.

Family PHOTIDAE.

26 *Microprotopus maculatus* Norman.
27 *Cheiriphotis megacheles* (Giles).
28 *Photis longicaudata* (Bate & West.).
29 *Photis digitata* Barnard.

Family AMPITHOIDAE.

30 *Ampithoe inda* (M. Edw.).
31 *Grubia filosa* (Savigny).

Family COROPHIIDAE.

32 *Grandidierella bonnieri* Stebbing.
33 *Grandidierella gilesi* Chilton.
34 *Cerapus abditus* Templeton.
35 *Ericthonius brasiliensis* (Dana).
36 *Corophium acherusicm* Costa.
37 *Corophium madrasensis* Nayar.

Family PODOCERIDAE.

38 *Podocerus brasiliensis* (Dana).

Sub-order HYPERIIDEA.

Family HYPERIIDAE.

39 *Hyperia bengalensis* (Giles).

Family LYCAEOPSIDAE.

40 *Brachyscelus crusculum* Bate.

Family OXYCEPHALIDAE.

41 *Rhabdosoma armatum* (M. Edw.).

SYSTEMATIC ACCOUNT.

Sub-order GAMMARIDEA.

Family LYSIANASSIDAE.

1. **Shoemakerella nasuta** (Dana).

(Plate I, figs.1—15.)

Lysianassa nasuta Dana, 1853–55, p. 915, pl. 62, fig. 2 a–m.
Lysianax cubensis Stebbing, 1897, p. 29, pl. 7B.
Lysianassa cubensis and *nasuta* Stebbing 1906, p. 38, 7, 40.
Lysianassa alba Pearse 1912, p. 369.
Lysianassa alba Shoemaker, 1921, p. 99.
Shoemakerella nasuta Pirlot, 1936, p. 264.
Shoemakerella nasuta Shoemaker, 1948, pp. 1–2.

Locality.—Twenty-eight specimens, both male and female, of this species were obtained from a collection made on 14th July 1949 from the Madras harbour. They were found on an old wooden block which was floating on the water.

Distribution.—This species has been described by Dana (1853) from Rio de Janeiro, Brazil, and it has since been recorded from Barbados, Puerto Rico, Cuba, Tortugas, the coast of Florida and from Gulf of Mexico. This is the first record of this species from India.

Description.—Head lateral angles broadly rounded. Side-plate 1 expanded below, 5th broader than deep. Pleon segment 3, postero-lateral angles almost quadrate, but with convex hind margin. Eyes large, oval, dark. Antenna 1 (pl. I, fig. 1) 1st joint not produced into apical teeth, flagellum small, 8—10 joints, accessory flagellum 2—4 jointed. Antenna 2 (pl. I, fig. 15) in female, flagellum longer than the peduncle ; flagellum composed of about 8—10 joints. Antenna 2 (pl. I, fig. 2) in male, flagellum very long, slender and composed of about 50 joints.

Gnathopod 1, (pl. I, fig. 6) 5th and 6th joints sub-equal in length ; 6th tapering towards the end. Gnathopod 2 (pl. I, fig. 7) 5th joint slightly bulged distally at the lower margin ; 6th joint longer than broad, bulged a little distally, transversely truncate, finger minute, closely fitting the palm.

Peraeopods 1 (pl. I, fig. 8) and 2 slender, 4th joint with upper distal end produced forwards and tipped with 2 or 3 spines. Peraeopod 3, (pl. I, fig. 9) 2nd joint broader than long. Peraeopod 4, 2nd joint with convex front. Peraeopod 5, (pl. I, fig. 10) 2nd joint large, oval.

Uropod 1 (pl. I, fig. 11), peduncle longer than the subequal rami. Uropod 2 (pl. I, fig. 12) inner ramus much dilated, and towards the end strongly and abruptly constricted. Uropod 3 (pl. I, fig. 13) short, peduncle stout, rami subequal.

Size.—Length of the male from front of the head to the end of the uropods is about 5-7 mm.

2. Lepidepecreum foraminiferum Stebbing.

(Plate I, figs. 16—26).

Lepidepecreum foraminiferum Stebbing, 1888, p. 686, t. 24.
Anonyx longicornis Della Valle, 1893, p. 814.
Lepidepecreum foraminiferum Stebbing, 1906, p. 79.

Locality.—Only a single male and two females of this species were collected from the gill chamber of a dead crab washed ashore at Hare Island, Tuticorin, on 1st February, 1950.

Distribution.—The occurrence of this species has been previously recorded from the Southern Indian Ocean (Kerguelen Island) by Stebbing. This is the first record of this species from India.

Description.—Head slightly rostrate, lateral angles outdrawn into long narrow lobes, ending obtusely. Side-plate 5 with breadth and depth subequal. Pleon segment 3, postero-lateral angles acute, slightly upturned.

Antenna 1 (pl. I, fig. 16) in female, flagellum with five joints, 1st very large, accessory flagellum 2-jointed ; in male, flagellum with 6 joints, 1st large, accessory flagellum 3-jointed slender. Antenna 2 (pl. I, fig. 17) in female, ultimate joint of peduncle shorter than either of the preceding, in male rather longer than either ; flagellum in female with 4-5 joints, in male with many.

Gnathopod 1 (pl. I, fig. 19) 6th joint nearly as long as 5th, of uniform width, palm slightly concave and the inner distal end produced forwards slightly. Gnathopod 2 (pl. I, fig. 20), 6th joint more than half the length of 5th, both distally widened on the lower margin. Peraepods 3-5, 2nd joint large, overlapping 3rd. Peraeopod 5 (pl. I, fig. 22) very large, much longer than the rest of the limbs. In peraeopods 3-5, 4th joint expanded. Uropod 3 (pl. I, fig. 25), rami rather broad, outer the longer, with setae also in female. Telson (pl. I, fig. 26) cleft not quite to the centre, with 2 pairs of marginal spinules.

Size.—Length of the male from the front of the head to the end of the uropods is about 4-5 mm.

Family AMPELISCIDAE.

3. Ampelisca zamboangae Stebbing.

(Plate II, figs. 1—11.)

Ampelisca zamboangae Stebbing, 1888, p. 1057, pl. 106.
Ampelisca chevreuxi Walker, 1904, p. 254, pl. 3, fig. 15.
Ampelisca zamboangae Pirlot, 1936, p. 280.
Ampelisca zamboangae Barnard, 1937, p. 149.

Locality.—Nearly fifteen males and twelve females belonging to this species were collected from the dredge collections made at Madras inshore waters on 11th December 1949, 12th January, 1950 and 27th February, 1950.

Distribution.—This species was described by Stebbing (1888) from Philippine Island and it has since been recorded from Ceylon by Walker (1904), East Indies by Pirlot (1936) and from Red Sea by Barnard (1937). This is the first record of this species from Madras Coast.

Description.—Head narrow, rounded in front, longer than the first two segments combined. Antenna 1 (pl. II, fig. 1), peduncle sub-equal to flagellum. Second joint of the peduncle longer than the third. Antenna 2 (pl. II, fig. 2), flagellum longer than the peduncle, about 8—10 joints.

Gnathopod 1 (pl. II, fig. 5), coxal plate broader towards the distal end, fringed with plumose setae; 2nd joint slender, fringed with plumose setae on the upper margin; 5th joint slightly longer than the 6th; 7th joint curved, inner margin slightly serrated. Gnathopod 2 (pl. II, fig. 6), 2nd joint long but devoid of plumose setae. 5th joint long; 6th joint about half as long as the preceding joint.

Peraeopod 5 (pl. II, fig. 7), 2nd joint produced behind to the middle of the 4th joint, with long plumose setae on the lower margin; 3rd joint shorter than the 4th; 5th joint with the distal corner at the front margin produced downwards slightly; 6th joint oval; 7th narrowed rather suddenly to a long crooked point.

Uropod 1 (pl. II, fig. 8), peduncle slightly longer than the sub-equal rami, uropod 2 (pl. II, fig. 9) longer than uropod 1, inner margins of peduncle and rami provided with spines. Uropod 3 (pl. II, fig. 10), rami longer than the peduncle, sub-equal; the outer the narrower, with a few very small spines on the outer and plumose setae on the inner margin; the inner with a few setae on the outer margin near the end. Telson (pl. II, fig. 11), divided almost to the base, the divisions pointed, with one or two small spines at each end.

Size.—Length of the male and female from front of the head to the end of the uropods is about 5—7 mm.

4. **Ampelisca cyclops** Walker.

(Plate II, figs. 12—18.)

Ampelisca cyclops Walker, 1904, p. 254, pl. II, figs. 14.
Ampelisca cyclops Pirlot, 1936, p. 280.
Ampelisca cyclops Barnard, 1937, p. 149.

Locality.—Nearly thirteen specimens, four males and nine females, of this species were obtained from two dredge collections made at the Madras inshore area on 13th December, 1949 and 12th January, 1950.

Distribution.—This species was first recorded off the coast of Ceylon by Walker (1904) and it has since been recorded from East Indies by Pirlot (1936) and from Suez Canal by Barnard (1937). This is the first record of this species from India.

Description.—Head as long as the first three segments combined and is produced to the end of the first joint of the antenna 1. At the apex of the head on either side are placed the eyes, each having a single lens. The lenses are surrounded by red pigment. The hind margin of the third pleon segment is convex and hollowed out just above the acute posterior angle.

The antenna 1 placed much in front of antenna 2, and reaches nearly to the end of the peduncle of antenna 2 ; 4th joint slightly longer than the 5th ; flagellum 7—9 jointed Antenna 2, peduncle shorter than the flagellum ; flagellum composed of about 13—15 joints. Mandible slender and is as described by Walker (1904). But Walker's figure shows a 4-jointed palp due to the accidental division of the 2nd joint by a cross line.

Gnathopod 1 (pl. II, fig. 12), 2nd joint long, broad towards the distal end ; 5th joint slender and longer than the 6th ; joints provided with plumose setae on both the margins. Gnathopod 2 (pl. II fig. 13), long and slim ; 5th joint very long ; 6th joint slightly longer than the 4th and without any distinct palm ; 7th joint fairly long and thin ; joints provided with plumose setae on both the margins.

Peraeopods 1 (pl. II, fig. 14), and 2, 5th joint short ; 7th joint longer than 5th and 6th combined. Peraeopod 3, 2nd joint wide ; 6th joint slender, almost as long as the 5th. Peraeopod 5 (pl. II, fig. 15) posterior lobe of the second joint extending slightly beyond the end of the 4th joint, lower margin fringed with long plumose setae ; 3rd and 4th joints short ; angles hardly produced ; anterior angle of the 5th joint produced one-third the length of the 6th, spinous on the truncate end ; 6th joint wide, oval, truncate at the end ; 7th joint shorter than 6th, tapering gradually to a very sharp point.

Uropod 1 (pl. II, fig. 16) reaches to the middle of the rami of the uropod 2 ; rami smooth, curved, sub-equal, longer than the peduncle. Uropod 2 (pl. II, fig. 17) longer than uropod 1, peduncle longer than the rami, sub-equal, straight and spinous, spines slender, distal end very long. Uropod 3 (pl. II, fig. 18) peduncle shorter than the rami, unarmed except three or four slender small spines on the inner side ; outer ramus a little longer than the inner ; outer margin fringed with very small spines ; inner margin with long plumose spines on the inner distal half ; the inner ramus widest about one-third of the distance from its base ; outer margin with 4—6 small spines and the distal end with 8—10 long plumose setae. Telson cleft rather more than half its length and provided at its distal end with 4 small spines on each half.

Size.—Length of the male and female from the front of the head to the end of the uropods is about 8—10 mm.

5. Ampelisca tridens Walker.

(Plate II, figs. 19—29.)

Ampelisca tridens Walker, 1904, pp. 249–250, pl. II, fig. 11 and pl. IV, fig. II.

Locality.—Seven specimens, two males and five females were obtained from a dredge collection made at the Madras inshore area on 30th July, 1949.

Distribution.—This has been previously recorded from the coast of Ceylon by Walker (1904). This is the first record of this species from India.

Description.—The apex of the head not produced forwards, slightly longer than the first 2 segments combined. Eyes with two pairs of distinct lenses, lower pair placed forward on the lower corner of the cephalon.

Antenna 1, extending nearly two-thirds the length of antenna 2; flagellum longer than the peduncle with 12—14 joints. Antenna 2, about three-fourth the length of the body, peduncle sub-equal to flagellum, flagellum 14—17 jointed.

Gnathopod 1 (pl. II, fig. 24) slender, 5th joint longer than the 6th, palm not differentiated. Gnathopod 2 (pl. II, fig. 24) slender, 5th joint shorter than the 2nd; 7th joint thin and slightly curved.

Peraeopod 1, rather very thin, 4th joint provided with a few plumose setae at the distal end; 7th joint longer than the 5th and 6th joints combined. Peraeopod 2 (pl. II, fig. 25) like peraeopod 1 but much stouter and slightly longer than the other; 4th joint provided with setae on both inner and outer margins. No plumose setae. Peraeopod 3, convex in front with a rounded expansion behind; 5th joint with a row of about five lateral spines on the outer margin; 6th slightly shorter than 5th, widening distally. Peraeopod 4, almost as long as peraeopod 3, 2nd joint sub-quadrate. Peraeopod 5 (pl. II, fig. 26) posterior lobe of the 2nd joint extending to the end of the 4th joint, lower margin fringed with many long setae; 3rd joint as long as the 4th and 5th combined; 6th joint oval, widest near the base with a few small spines at the distal end; 7th joint long, tapering.

Uropod 1 (pl. II, fig. 27) peduncle provided above with few spines; rami unequal, slender and curved; both the rami are devoid of any spines on both the margins. Uropod 2 (pl. II, fig. 28), rami wider than that of the 1st; straight sub-equal; the outer ramus with a long spine at the end of the inner margin; both the rami provided with spines on the inner margins. Uropod 3 (pl. II, fig. 29), peduncle much shorter than the rami; peduncle with a spine and short setule at the inner margin, outer ramus much narrower, with one long and two short spines near the tip and a few plumose setae both on the outer and inner side; inner ramus with two spines near the end of the inner margin and two long and two short spines on the inner side. Telson divided to the base.

Size.—Length of the male from front of the head to the end of the uropod is about 7—8 mm.

6. Byblis lepta (Giles).

(Plate II, figs. 30—34.)

Ampelisca lepta Giles, 1888, p. 223, t. 8 and 9.
Ampelisca lepta Della Valle, 1883, p. 894.
Byblis lepta Stebbing, 1906, p. 115.
Byblis lepta Barnard, 1937, p. 151.

Locality.—A single female specimen belonging to this species was obtained from a dredge collection made at Madras on 6th December, 1948.

Distribution.—This has been previously recorded from the Bay of Bengal (1888) and from the Suez Canal (1937). This is the first record of this species from the Madras Coast.

Description.—Head of moderate size, irregularly quadrate. Eyes fairly large, placed on the produced upper part of the cephalon, surrounded by dark brown pigment. Antenna 1 (pl. II, fig. 30), reaching a little beyond peduncle of antenna 2, flagellum with 10—12 very slender joints ; Antenna 2, two-thirds the length of the body, ultimate joint of peduncle a little shorter than penultimate, flagellum 14—15 jointed.

Gnathopod 1 (pl. II, fig. 31) 2nd joint long ; 5th joint slender and longer than the succeeding joint ; joints with setae on both the margins. Gnathopod 2 (pl. II, fig. 32) long and slim ; 2nd joint slightly longer than the 5th ; 6th joint short, nearly half as long as the preceding joint.

Peraeopod 2 elongate ; peraeopod 5 (pl. II, fig. 34), 2nd joint descending below the 4th. Uropod 3, rami apparently serrate on confronted margins and angled near the base. Telson deeply cleft, semilunar.

Size.—Length of the female from the front of the head to the end of the uropods is about 5—6 mm.

Family HAUSTORIIDAE.

7. Platyischnopus herdmani Walker.

(Plate III, figs. 1—15.)

Platyischnopus herdmani Walker, 1904, p. 247, pt. II, fig. 10.

Locality.—From a dredge collection made at Madras Coast on 1st September, 1949 four female specimens were collected. Only a single male specimen was got from the plankton collection made on 18th July, 1950.

Distribution.—This has been previously recorded from the coast of Ceylon by Walker (1904). This is the first record of this species from India.

Description.—Female : Body is compressed, head nearly as long as the first four segments and is produced to a point which is wrinkled and surrounded by short spines. Eyes not present. The first three segments are sub-equal and shorter than the other segments, which increase in length successively. The third pleon segment has two dorsal and one or two dorso-lateral teeth just below the dorsal on each side on the hind margin.

The antenna 1 (pl. III, fig. 1) is placed very much in front of antenna 2. The peduncle is shorter than the flagellum. The 1st joint of the peduncle is almost of the same length as that of the 2nd joint, but is much stouter. The flagellum is 7 jointed (Walker 6 jointed) and the accessory flagellum barely reaches the end of the second joint of the flagellum. The accessory flagellum is two jointed. The whole antenna is without spines or setae except single ones at the ends of joints. Antenna 2 (pl. III, fig. 2) has the flagellum longer than the peduncle. The second joint of the peduncle is four times as long as the first. The flagellum is 9—11 jointed. Mandible (pl. III, fig. 3) has the palp three jointed, first one being the smallest. The second is bulged at the middle, third is almost the same length as the second but narrower than the second with four or five long spines at the distal end of it. The maxillepeds (pl. III, fig. 6) with inner plates very small and tapering with a short spine and strong plumose setae on the tip. The inner edge almost smooth. Palp with the third joint shorter than the second and is widening distally.

The gnathopod 1 (pl. III, fig. 7) has the side plates small and narrowly oval. The second joint nearly as long as the third and fourth combined and is much distended distally ; fifth joint slightly shorter than the second but much narrow ; the sixth joint is sub-triangular and the lower distal end of it is slightly produced so as to form a chela. The gnathopod 2 (pl. III, fig. 8) is very much like gnathopod 1 excepting the fifth joint which is twice as long as the fifth joint of gnathopod 1. Peraeopod 1 (pl. III, fig. 9) has the side plates rhomboidal, widening below ; the second joint nearly as long as the next three joints. The fourth is longer than the sixth which one is longer and narrower than the fifth. The posterio-distal margin of the fourth, fifth and sixth joints are provided with spines ; seventh joint slender and slightly curved. Peraeopod 2 is very much like peraeopod 1 but the side-plates are much produced behind. Peraeopod 3 (pl. III, fig. 10) has the second joint narrow, and widening distally with a long spine at the produced end of the front margin. The fourth joint is much broader and the distal end of the lower portion is produced slightly. The joints four to six are spinous and the sixth joint is about half as wide as the fifth. The seventh joint is half as long as the sixth.

The uropod 1 (pl. III, fig. 13) is longer than uropod 2 and the peduncle is shorter than the equal rami. Both peduncle and rami are spinous. The uropod 2 is like uropod 1, but smaller. Uropod 3 (pl. III, fig. 14) has the peduncle strong and cylindrical. The outer ramus lamellar and spear-shaped. The inner ramus is two jointed, 1st joint being four times the peduncle and is provided with spines. The second joint slender, pointed and straight.

Telson is convex above, broad and provided with few slender spines.

Male.—The male differs from the female in antenna 1. The first joint of the peduncle is swollen and hemispherical, second twice as long as the third. The third is provided with a dense fringe of setae round the distal end. The flagellum is longer than the whole animal and very slender. Accessory flagellum is two jointed. In all the other characters it resembles the female.

Size.—Length of the male from front of the head to the end of the uropods is about 4–5 mm.

8. Urothoë spinidigitus Walker.

(Plate III, figs. 16–28.)

Urothoë spinidigitus Walker, 1904, pp. 245–246, pl. I, fig. 9.

Locality.—Two female specimens belonging to this species were obtained from a dredge collection at the Madras inshore waters on 14th December, 1949.

Distribution.—This has been previously recorded from Ceylon. This is the first record of this species from India.

Description—Female.—Antenna 1 (pl. III, fig. 16) peduncle longer than the flagellum, second and the third joints of the peduncle almost of the same length ; flagellum 4 jointed ; accessory flagellum two jointed. Antenna 2 (pl. III, fig. 17), penultimate and anti-penultimate joints of the peduncle with a row of irregular spines on the lower margins.

Gnathopod 1 (pl. III, fig. 20) side-plates very small, second joint very long, 5th joint broader towards the base with a row of spines ; 6th joint slender and shorter than the 5th ; 7th joint curved. Gnathopod 2 (pl. III, fig. 21) like gnathopod 1, but slightly longer than the first.

Peraeopod 2 (pl. III, fig. 22), 2nd joint rather longer than the 3rd and 4th combined ; 2nd joint with two or three plumose setae at the lower distal end ; 6th joint shorter and much narrower than the 5th, dilated and rounded at the end, where there are 3 or 4 spines of unequal length on the hind margin and two very short ones at the base of the 7th joint. Peraeopod 3 (pl. III, fig. 25) the 2nd joint projecting behind with a few marginal setae, front margin almost straight ; 5th joint greatly expanded, with 2 parallel transverse ridges bordered with strong blunt spines and very long plumose setae ; 6th joint longer and narrower than the 5th, with 3 irregular rows of similar, but more unequal, spines and setae. Peraeopod 4 (pl. III, fig. 24), 2nd joint oblong, hind margin with a row of five or six plumose setae ; 6th joint as long as the preceding joint, but slender ; 7th joint almost straight, slender, minutely and irregularly tuberculated with a denticle near the points. Peraeopod 5 (pl. III, fig. 25) like the 4th, but without plumose setae on the hind margin on the 2nd joint.

Uropod 2 (pl. III, fig. 27) peduncle shorter than the rami, peduncle with a few spines on the lower distal end. Uropod 3, with few spines on the outer margin of the outer ramus. Telson (pl. III, fig. 28) deeply cleft.

Size.—Length of the female from front of the head to the end of the uropods is about 4–5 mm.

Family PHOXOCEPHALIDAE.

9. Leptophoxus uncirostratus (Giles).

(Plate IV, figs. 1—16.)

Phoxus uncirostratus Giles, 1890, p. 65, pl. ii, fig. 2.
Leptophoxus uncirostratus Walker, 1904, p. 249.

Locality.—Nearly twenty-five specimens of this species were obtained from two or three dredge collections made in the Madras inshore waters during September, 1949 and January, 1950.

Distribution.—This species has been previously recorded by Giles (1890) from a dredge collection off the ' Seven Pagodas ' off the Madras Coast on a sandy bottom. Later on Walker (1904) has recorded it from the Ceylon Coast.

Description.—Head small, rostrate. Rostrum long and pointed, considerably exceeding the head proper in length. Eyes not present. Antenna 1 (pl. IV, fig. 1) peduncle shorter than flagellum ; 1st joint of the peduncle long with 4 or 5 slender spines on the lower surface at the distal end ; 2nd joint longer than the 3rd with a few plumose setae at the dorsal side at the distal corner ; flagellum composed of 12—14 joints (14—16 joints Giles). Accessory flagellum 10 jointed. Antenna 2 (pl. IV, fig. 2) longer than antenna 1 ; 2nd joint of the peduncle fairly large ; 3rd shorter and smaller than 4th ; flagellum 12 jointed.

Gnathopod 1 (pl. IV, fig. 6), 2nd joint long ; 5th longer than the 4th with slender spines on the lower side at the distal end ; 6th oblique ; the distal end of the lower side is slightly produced so as to form a triangular process ; upper margin slightly convex, even ; subchelate. Gnathopod 2 (pl. IV, fig. 7) slightly longer than gnathopod 1 ; 4th joint lower distal end produced downwards ; 5th joint triangular ; 6th joint lower margin produced fairly well ; tip of the 7th joint reaches the produced point of the 6th joint.

Peraeopods one and two (pl. IV, figs. 8 and 9) are almost of the same shape, the peraeopod two being the longest . The distal end of the anterior margin of the fourth joint is produced slightly. The fifth joint is much smaller than the fourth and is provided only at lower margin with spines. The sixth joint is longer than the fifth and the distal end of the inner side is slightly bulged out and it bears a few spines. The seventh joint is developed well and is curved inwards slightly. Peraeopod 3 (pl. IV, fig. 10) is much smaller than the 4th ; second joint is longer and is much compressed ; third joint is rather very small ; fourth joint is smaller than the fifth ; the sixth joint is slender but is about three fourth as long as the first ; joints four to six are provided on both the margins with well developed spines. Peraeopod fourth (pl. IV, fig 11) the longest ; second joint fairly developed

with a few spines on the outer margin of the outer side ; third joint rather very small ; fourth joint much broader than the fifth ; sixth joint slender and is longer than the fifth one. All the joints are provided with very well developed spines. The seventh joint is strong and tapering and slightly curved. The peraeopod five (pl. IV, fig. 12) is rather very short with its second joint expanded well extending distally about the same level as the tip of the seventh joint.

Uropod 1 (pl. IV, fig. 13), peduncle longer than the rami ; both the the rami provided with two or three spines on the upper margin. Uropod 2 (p. IV, fig. 14) smaller than uropod 1 ; rami, shorter than the peduncle ; peduncle as well as both the rami are provided with spines on the upper margins. Uropod 3 (pl. IV, fig. 15) inner ramus very small, spiniform ; outer slender, 2-jointed and provided with spines. The telson (pl. IV, fig. 16) is small and cleft and is furnished with a few fine spines and also with one or two plumose setae.

Size.—Length of the male from front of the head to end of the uropods is about 4—5 mm.

Family AMPHILOCHIDAE.

10. Cyproidea ornata Haswell.

(Plate IV, figs. 17—30.)

Cyproidea ornata, Haswell, 1880, p. 320, Taf. 18, fig. 1.

Cyproidea ornata, Stebbing, 1910, p. 578.

Cyproidea ornata, Barnard, 1925, p. 341.

Cyproidea ornata, Hale, 1929, p. 200, fig. 206.

Gallea tecticauda, Walker, 1904, p. 256, pls. 3 and 8, fig. 16.

Cyproidea ornata, Schellenberg, 1938, p. 18 (literature).

Locality.—Five specimens of this species were got from the plankton collections from Madras Coast on 30th October, 1949. More than thirty-five specimens were also collected from the Sponge Bay, Krusadai Island, on 31st January, 1950.

Distribution.—This has been previously recorded from S. Australia, Ceylon, Suez Canal, Cape Land and Bismarch Archipelago. This is the first record of this species from India.

As a complete account of this species has been given by Walker (1904) only the salient features are briefly recounted here.

Salient features.—Head with a small pointed and deflexed rostrum ; eyes large ; side-plate 3 and 4 large ; the 4th largest ; 1st and 2nd side-plates very small and are hidden by the 3rd plate. Antenna 1 (pl. IV, fig. 17), the second joint of the peduncle with an elevated ridge produced above the short third joint for nearly half its length. Antenna 2 (pl. IV, fig. 18), flagellum 3 jointed. Mouth parts, gnathopods and peraeopods (pl. IV, figs. 19–26) as in Walker's (1904) description. Uropod 1 (pl. IV, fig. 27), peduncle longer than rami, rami unequal and minutely pectinate. Uropod 3 (pl. IV, fig. 29) peduncle shorter than the inner and about as long as the outer ramus. Rami stiliform, the margins minutely pectinate. The second segment of the uropod produced in a hoof-like process convex above and extending over half the telson. Telson (pl. IV, fig. 30) entire.

Size.—Length of the male and female from the front of the head to the end of the uropods is about 4 mm.

Remarks.—Walker (1904) has drawn and described the inner margins of the rami as spinose. But the specimens that have been examined here do not possess any spines.

Family LEUCOTHOIDAE.

11. Leucothoe spinicarpa (Abildg).

(Plate V, figs. 1—6.)

Leucothoe spinicarpa, Schellenberg, 1931, p. 92.
Leucothoe spinicarpa, Shoemaker, 1933, pp. 8–9.

Locality.—Only a single specimen (male) of this species was collected from a collection made at the Madras harbour on 8th September, 1948. One more male specimen was obtained from a collection made at Sponge Bay on 29th January, 1950.

Distribution.—This is a cosmopolitan species.

Description.—Male : Body slender, back broadly rounded. Side-plate 1, somewhat expanded distally, 2nd broader than deep. Pleon segment 3, posterio-lateral corners quadrate, with minutely produced point. Eyes oval, bright red. Antenna 1 (pl. V, fig. 1), scarcely $\frac{1}{3}$ the length of the body ; peduncle longer than the flagellum, 1st and 2nd joints of the peduncle sub-equal, 3rd joint rather small, nearly $\frac{1}{4}$ the length of 2nd ; flagellum 14 to 15 jointed ; sensory filaments found on the segments on the upper margin ; accessory flagellum rather very small. Antenna 2 (pl. V, fig. 2) shorter than antenna 1, 4th and 5th joints of the peduncle long and sub-equal, 5th joint with one or two small plumose setae on either side at the distal end ; flagellum shorter than the penultimate joint of the peduncle ; flagellum 10 jointed.

Gnathopod 1 (pl. V, fig. 3) process of 5th joint spiniform, inner margin quite smooth, apex slightly curved, 6th joint parallel sided, inner margin finely serrate and with a row of curved setules, finger about half its length, slender, curved. Gnathopod 2 (pl. V, fig. 4) process of 5th joint densely setose, 6th oval.

Peraeopods.—1–5 (pl. V, figs. 5 and 6) sub-equal, marginal spinules short, finger small.

Uropod 3, much more than half the length of the peduncle. Telson thrice as long as broad, uniformly tapering to acute apex.

Size.—Length of the male from front of the head to end of the uropods is about 10 mm.

Family STENOTHOIDAE.

12. Stenothoe gallensis (Walker).

(Plate V, figs. 7—19.)

Stenothoe gallensis, Walker, 1904, p. 261, pl. 3, fig. 19.
Stenothoe galleniss, Barnard, 1916, p. 154.
Stenothoe gallensis, Schellenberg, 1928, p. 640.
Stenothoe crenulata, Chevreux, 1907, p. 471.
Stenothoe crenulata, Shoemaker, 1935, p. 207, fig. 2.
Stenothoe gallensis, Barnard, 1937, pp. 153–154.

Locality.—Large numbers, both males and females, of this species were found among the algae attached to buoys at the Madras harbour.

Distribution.—Ceylon (Walker 1904); South Africa (Barnard 1916); Gambier Archipelago (Chevreux 1907); Porto Rico (Shoemaker 1935).

Recorded localities in Indian Ocean.—This has been previously recorded from Ceylon, Seychelles, Zanzibar, Red Sea, and also from Dar-es-Salaam. This is the first record of this species from India.

A complete description of this species with sketches has been given by Walker (1904). The features of specimens that have been dissected, agree fully with Walker's diagrams and description, excepting in the number of joints of the flagellum in antenna 1. Walker has stated that there were 22 joints, but the specimens examined here had a 16—18 jointed flagellum.

Salient features.—Head scarcely produced. Eyes rounded. Antenna 1, slightly longer than antenna 2. Gnathopod 1 (pl. V, figs. 9 and 19) almost the same in both the sexes. Gnathopod 2 in male (pl. V, fig. 10), the hind margin of the 4th joint crenate, with a setule in each notch; 6th joint hind margin straight and densely hirsute; distal end of the 6th joint is provided with a double pointed tooth. Uropod 1 (pl. V, fig. 16), peduncle

longer than the two remaining joints, with 5 or 6 spines on the upper margin ; the last joint bent upwards in the middle. Telson (pl. V, fig. 17) concave above, oblong with 4 spines increasing in size distally on the proximal half of each side.

Size.—Length of the male as well as the female, from front of the head to the end of the uropods is about 4–5·5 mm.

Family OEDICEROTIDAE.

13. Perioculodes longimanus (Bate and Westwood).

(Plate V, figs. 21—33.)

Monoculodes longimanus, Bate and Westwood, 1868, p. 507.
Perioculodes longimanus, Sars, 1892, p. 313, t. 110, f. 2 ; t. 111, f. 1.
Oediceros longimanus, Della Valle, 1893, p. 547, t. 4, f. 9 ; t. 33, f. 32–36.
Perioculodes longimanus, Stebbing, 1906, p. 237.

Locality.—Forty-two specimens were obtained from a plankton collection made on 29th March, 1950 at Madras inshore area. A few more specimens were also obtained from three or four plankton collections made in the very same month.

Distribution.—This species has been previously recorded from Arctic Ocean, North Atlantic, Norway, France, Great Britain and Mediterranean. This is the first record of this species from India.

Description.—Head, rostral projection short, broad, triangular, lateral corners rounded. Side-plate 1 rather expanded and obliquely truncate, 2nd and 3rd oblong, 4th very long ; lower hind corner a little produced, obtuse, 5th broad, less deep. Eyes broadest at top. Antenna 1 (pl. V, fig. 20) in female peduncle as long as the flagellum ; flagellum 10 jointed. Antenna 1 in male very like the female, but with more number of spines and setae on all the joints in the flagellum. Antenna 2 (pl. V, fig. 21) in female flagellum 8–9 jointed. In male flagellum very long nearly as long as the body ; flagellum composed of about 60 joints. Gnathopod 1 (pl. V, fig. 23) process of the 5th joint rather flexuous, nearly reaching end of 6th, which is about twice as long as broad. Gnathopod 2 (pl. V, fig. 24) slightly longer than gnathopod 1.

Peraeopods 1—4 (pl. V, figs. 25–28) moderately slender, densely setose, in first and second joints ; finger rather very small. Peraeopod 5 (pl. V, fig. 29) 2nd joint quadrangular oval, 5th and 6th sub-equal, each longer than 4th.

Uropod 1 (pl. V, fig. 30), the longest, peduncle longer than the sub-equal rami ; inner ramus slightly bent at the middle ; outer ramus provided with 3–4 spines. Uropod 2 (pl. V, fig. 31) peduncle shorter than the sub-equal rami. Uropod 3 (pl. V, fig. 32) small ;

peduncle slightly shorter than the rami. Telson small (pl. V, fig. 33), apically rounded.

Size.—Length of the male from front of the head to the end of the uropods is about 3–5 mm.

Family CALLIOPIIDAE.

14. Paracalliope indica Barnard.

(Plate VI, figs. 1—7.)

Paracalliope fluviatilis, Chilton, 1921, p. 529, fig. 3 (*Paracalliope fluviatilis* non Thomson).
Paracalliope indica, Barnard, 1935, pp. 280–281, fig. 1.

Locality.—More than one hundred specimens, both males and females, belonging to this species were collected from the mouth of Cooum River. They are usually found attached to the green algae that are found floating in the water.

Distribution.—This has been previously recorded from Chilk Lake (Chilton) and from Lower Bengal (Barnard).

Description.—The antero-lateral angles of head moderately acute; rostrum not prominent. Eyes are very large. Hind margins of peraeon and pleon segments dorsally entire. Side-plates 1—4 with few and slightly setiferous indents on lower margins.

Antenna 1, 1st joint stout, 2nd much more slender, 3rd joint about as long as the second; flagellum in male 13 jointed. Antenna 2, sub-equal in length to the first antenna; flagellum longer than the peduncle and is about 15 jointed.

Gnathopod 1 (pl. VI, fig. 3) in male, 2nd joint long, 5th joint broader towards the base; 6th joint about as long as the 5th provided with free spines on the inner margin; 7th joint curved. Gnathopod 2 (pl. VI, fig. 2) considerably stronger, 5th joint is triangular with the lower end fringed with small spines; 6th joint rather very large. Gnathopods 1 and 2 (pl. VI, figs. 6 and 7) in female almost alike and resembles very much gnathopod 1 of the male.

Peraeopods 1–4, 6th joint longer than either 4th or 5th, 4th to 6th joints are spinose. Peraeopod 5 (pl. VI, fig. 4) much longer than the 4th; 7th joint about as long as the preceding joint, straight and spinose.

Uropods 1 and 2, peduncle and rami completely spineless; outer ramus in uropod 1 slightly shorter (in uropod 2 distinctly shorter) than inner ramus. Uropod 3 (pl. VI, fig. 5) peduncle with 1 apical spinule, outer ramus shorter than inner, both with one or two spinules on upper margins. Telson short and entire.

Size.—The length of the male and also the female, from front of the head to end of the uropods is about 3–4 mm.

Family GAMMARIDAE.

15. Eriopisa chilkensis (Chilton).

(Plate VI, figs. 8—17.)

Niphargus chilkensis Chilton, 1921, pp. 531–535, fig. 4.
Eriopisa chilkensis Barnard, 1935, p. 283.

Locality.—More than sixty specimens belonging to this species, both male and female, were obtained from Adyar backwaters.

Distribution.—This was first recorded from Chilka Lake, by Chilton (1921) and has since been recorded by Barnard (1935) from Lower Bengal, Cochin and Travancore. This is the first record of this species from Madras Coast.

Description.—Body long and narrow, side-plates small, much shallower than the segments. Pleon segment with the posterior-lateral angles quadrate. Eyes small, irregular, apparently imperfect.

Antenna 1, peduncle shorter than the flagellum, first and second joint sub-equal, elongate ; third short, flagellum slender ; accessory flagellum with two slender joints. Antenna 2 (pl. VI, fig. 8), a little longer than the peduncle of antenna 1. The flagellum is shorter than the last joint of the peduncle and is composed of one long joint followed by two or three indistinct ones.

Gnathopod 1 (pl. VI, fig. 10), fourth joint produced into a rounded lobe ; fifth joint is much longer than the sixth joint with numerous tufts of setules on the posterior margin and on the surface near to it ; sixth joint widening distally. Gnathopod 2 (pl. VI, fig. 11) much larger than the gnathopod 1, fifth joint short, about one-third the length of the sixth joint. Sixth joint irregularly oval ; seventh joint strongly curved.

Peraeopods third, fourth and fifth (pl. VI, figs. 12 and 13) increasing in size posteriorly.

Uropod 3, greatly elongate, peduncle longer than the telson ; outer ramus formed on two sub-equal joints, somewhat broadened, inner ramus small, and tipped with one or two setae. Telson (pl. VI, fig. 17) cleft to the base, each lobe narrowing posteriorly and bearing a stout setule at the extremity.

Size.—Length of the female from front of the head to the end of the uropods is about 12 mm.

Remarks.—Regarding *Niphargus chilkensis* Chilton (1921) and *Niphargus philippensis* Chilton (1920) Schellenberg (1931) has pointed out that both of them do not belong to the genus *Niphargus*. Barnard 1935 has said " In fact it is strange that Chilton, having set out all the characters in which *chilkensis* differed from the diagnosis of *Niphargus*, should have completely ignored the genus *Eriopisa* ".

16. Megaluropus agilis (Hoek).

(Plate VI, figs. 18—29.)

Megaluropus agilis Walker, 1904, p. 278.
Megaluropus agilis Stebbing, 1906, p. 420.
Megaluropus agilis, Chevreux, 1925, p. 226. figs. 236–237.
Megaluropus agilis, Barnard, 1940, p. 453.
Megaluropus agilis, Schellenberg, 1942, p. 46, figs. 27–28.

Locality.—Twenty-four specimens, both male and female, were obtained from a plankton collection made at Madras inshore area on 18th August, 1950.

Distribution.—This species has been previously recorded from Kattegat ; North Sea, Holland ; Firth of Clyde ; Liverpool Bay ; English Channel, Bristol Channel and Gulf of Neples. This is the first record of this species from India.

Description.—Pleon segment 3 with hind margin dorsally serrate. Head, rostrum reaching nearly middle of 1st joint of antenna 1, lateral lobes rather broad, abruptly sharpended at apex, reaching much beyond rostrum. Side-plate 1 a little widened distally, 2nd larger, 3rd irregularly elliptic.

Antenna 1 (pl. VI, fig. 18) short, 1st joint shorter than the second, third very short flagellum 11 jointed with sensory filaments, but without calceoli, accessory flagellum two jointed. Antenna 2 (pl. VI, fig. 19) ultimate and the penultimate joints of peduncle sub-equal, very long ; flagellum 14—18 jointed. Gnathopod 1 (pl. VI, fig. 23), 5th joint oblong ovate, broader than 6th, which is of a tapering form, finger long, curved. Gnathopod 2 (pl. VI, fig. 24) 5th joint slightly longer than 6th, widening distally.

Peraeopods 1 (pl. VI, fig. 25) and 2, second joint bent, distally widened. Peraeopods 3 (pl. VI, fig. 26) and 4, 2nd joint wider below than above ; 4th joint wide, longer than any of the following joints. Peraeopod 5 (pl. VI, fig. 27), 2nd joint well expanded and the upper distal end is produced below the 3rd joint ; 4—7 joints elongate and except the 4th slender.

Uropod 1 (pl. VI, fig. 28) rami sub-equal, shorter than peduncle. Uropod 2, rami unequal, fringed with small spines on the dorsal margins. Uropod 3 broad. Telson much longer than broad, the convex outer margin of each lobe fringed with setules.

Size.—Length of the male from front of the head to the end of the uropods is about 4—5 mm.

17. Melita fresnalii (Aud.).

(Plate VII, figs. 1—5.)

Melita cotesi Giles, 1890, p. 64, pl. 2, fig. 1.
Melita anisochir Walker, 1904, p. 270, pl. 4, fig. 28.
Melita fresnalii Walker, 1909, p. 334.
Melita fresnelii Barnard, 1916, p. 189, pl. 28, fig. 32.
Melita fresnelii Schellenberg, 1928, p. 644.
Melita fresnelii Shoemaker, 1935, p. 239.
Melita fresnelii Barnard, 1937, p. 159.

Locality.—Two specimens of this species were obtained from a dredge collection made at Madras on 4th August, 1949.

Recorded localities in the Indian Ocean.—Andaman Island (Giles); Ceylon, Seychelles; Wasin, Suakim (Walker); Suez Bay (Schellenberg).

Distribution.—This species has been previously recorded from East Indies, South Africa, Australia, California, Red Sea, Gulf of Aden and Zanzibar area. This is the first record of this species from India.

Description.—Head longer than the first 2 segments combined. Eyes large, round, red. Pleon segments with dorsal teeth on the hind margin, increasing in size posteriorly. Antenna 1 nearly as long as the body, 1st joint twice as wide and two-thirds as long as the 2nd, lower margin convex, with 2 or 3 sub-central and a distal spine; 2nd joint 4 times as long as the 3rd. Appendage varying in the number of joints, generally 3 sub-equal, with a minute terminal, reaching beyond the end of the 3rd joint of the flagellum. Antenna 2, about two-thirds of the length of the antenna 1 and stouter except the 1st joint.

Gnathopod 1 (pl. VII, fig. 1) side-plates oblong, with rounded angles, wider below, with marginal setules; 2nd joint widening distally, 6th joint widely oval, palm undefined, hind margin very convex and setose; 7th joint half as long as the 6th. Gnathopod 2 (pl. VII, fig. 2) larger than the 1st; side plates oblong, not wider below; 2nd rather dilated, 5th very small, 6th and the finger forming a sort of chela, hind margin of the 6th joint longer than the front, produced to a spoon-shaped tooth, between which and the finger hinge are 3 teeth or tubercles; finger long and apically blunt.

Peraeopods 1 (pl. VII, fig. 3) and 2, 2nd joint widening abruptly; 7th joint strong, with a secondary tooth on the outside and a short spine on the inside. Peraeopods fourth and fifth (pl. VII, figs. 4 and 5) are much more powerful than the 3rd, and reaching backwards much beyond the ends of the uropods; the joints spinous.

Uropod 1 extending a little beyond the ends of the 2nd, slender; peduncles and rami sub-equal. Uropod 2 resembling the 1st. Uropod 3 with the outer ramus about twice as long as the peduncle, with spines between the base and the extremity; inner ramus quite rudimentary. Telson, the divisions sharply pointed, without terminal spines.

Size.—The length of the male from front of the head to the end of the uropods is about 4—6 mm.

18. Maera quadrimana (Dana).

(Plate VII, figs. 6—15.)

Gammarus quadrimanus Dana, 1853, p. 955, t. 65, f. 9.
Maera quadrimanus Bate, p. 194, t. 35, f. 5.
Maera quadrimana Stebbing, 1906, p. 434 (literature).
Maera quadrimana Schellenberg, 1938, pp. 45–48, fig. 21–22.

Locality.—More than sixty specimens were collected from the Madras harbour. Specimens belonging to this species were also collected from Krusadai Island and Ennur.

Distribution.—This has been previously recorded from Tropical and South-Pacific, Fiji Islands and New Zealand. This is the first record of this species from India.

Description.—Body slender and smooth. Side-plates 1—4 are shallow and are sub-quadrate. Antenna 1 (pl. VII, fig. 6), 1st and 2nd joints long, sub-equal, 3rd very short, flagellum rather shorter than peduncle, accessory flagellum rather longer than half the primary. Antenna 2 (pl. VII, fig. 7) peduncle shorter than in antenna 1, widened distally.

Gnathopod 1 (pl. VII, fig. 11) small, 6th joint oblong, both 5th and 6th widened distally; 7th joint curved. Gnathopod 2 (pl. VII, fig. 12) large, second joint longer than the succeeding three joints; 5th joint cup-shaped; 6th joint rather very large, widening distally, palm well differentiated, with a row of small curved spines; 7th joint long, tip of it curved inwards reaching the end of the palm.

Peraeopods one (pl. VII, fig. 13) and two slender and more or less alike in structure. Peraeopods 3—5 (pl. VII, figs. 14 and 15), 2nd joint moderately expanded, 4th joint rather broad, produced, finger sharply produced behind the short nail.

Uropod 1, longer than uropod 2, provided with spines on both the peduncle and rami on the upper margin and also at the tip of the rami. Uropod 3, peduncle shorter than the sub-equal rami; rami tipped with slender setae. Telson deeply cleft, provided with 3 or 4 long spines at each end.

Size.—Length of the female from front of the head to the end of the uropods is about 3—5 mm.

19. Maera pacifica Schellenberg.

(Plate VIII, figs. 16 and 17.)

Maera pacifica Schellenberg, 1938, pp. 42–45, figs. 19 and 20.

Locality.—Only a single specimen (male) belonging to this species was obtained from a collection made at Sponge Bay, Krusadai Island, on 30th January, 1950.

Distribution.—This has been previously recorded from Hawai Islands by Schellenberg in 1938. This is the first record of this species from India.

Description.—This species resembles very much *Maera quadrimana* but differs in antennae and gnathopods.

Eyes small and rounded. Antenna 1 (pl. VII, fig. 16), half as long as the body ; 1st joint of the peduncle with three spines at somewhat equal intervals ; 2nd joint rather longer than the first ; third $\frac{1}{3}$ the length of the 2nd ; flagellum shorter than the peduncle, 16—19 jointed ; accessory flagellum 7 jointed. Antenna 2, peduncle shorter than the peduncle of antenna 1 ; flagellum nearly 8 jointed.

Gnathopod 1, side-plates not extended ; anterior corners rounded ; second joint rather long. Gnathopod 2 (pl. VII, fig. 17), 2nd joint long, anterior distal end produced forwards ; 3rd joint short but slightly longer than the 4th, anterior distal end produced forwards ; 5th joint cup-shaped, large ; 6th joint large, hind margin drawn out into a large tooth, on the inner margin near tip of the tooth is a spine, palm separated from the corner tooth through a small, deep sinus, a second shallow, rounded sinus separates the short anterior region from the long posterior part, on the palm are present on outside and inside short, strong spines ; 7th joint somewhat thick in the middle.

Peraeopods 3 and 4 are slender, coxal plate rectangular, over $1\frac{1}{2}$ times broader than long, end claw of the dactylus in all the peraeopod legs with a tooth on the back.

Uropod 1 and 2 with long spines. Uropod 3 hardly surpasses the previous one, peduncle and rami somewhat equal in length ; rami distally truncated and provided with bristles ; outer margin of the outer rami with two clusters of spines ; the remaining margins only with one cluster.

Size.—Length of the male from front of the head to the end of the uropods is about 5—7 mm.

20. **Maera othonides** Walker.

(Plate VIII, figs. 1—18.)

Maera othonides Walker, 1904, p. 271, pl. V, fig. 29.
Maera othonides Walker, 1905, p. 927.
Maera othonides Chilton, 1921, p. 535, fig. 5.
Maera othonides Barnard, 1935, pp. 285–286.

Locality.—Nearly forty specimens of this species were collected from Adyar backwaters. This was found associated with the green algae found floating in the water.

Distribution.—This species has been recorded from Ceylon and Maldive Islands by Walker (1904 and 1905), Chilka Lake by Chilton (1921) and from Travancore and Cochin by Barnard (1935). This is the first record of this species from the Madras Coast.

Description.—Male: The body is elongate; the head not as long as the first two segments combined; eyes small, sub-oval and black in colour. The antenna 1 (pl. VIII, fig. 1) is more than half as long as the body. The first joint of the peduncle is shorter than the second, the lower margin bearing a distal spine and six or seven proximal spines. The second joint is devoid of any spines. The flagellum is shorter than the peduncle. The accessory flagellum is composed of about six joints. The flagellum is composed of about twenty-one joints. The antenna 2 (pl. VIII, fig. 2) has the peduncle about as long as the first two joints of antenna 1. The flagellum is slightly longer than the fifth joint of the peduncle and consists of about nine joints.

The upper lip is rounded and the lower lip is with small inner lobes. Mandible (pl. VIII, fig. 3) has the third joint of the palp a little less than one-third the length of the second joint with a few terminal long spines. Maxilla I (pl. VIII, fig. 4) has the inner plate small, outer plate with nine spine teeth and the palp with thirteen slender spines. Maxilla 2 (pl. VIII, fig. 5) is normal. Maxillipeds (pl. VIII, fig. 6), inner plate armed distally with long spines, rather long teeth and several slender, curved spines; inner margin with a few plumose setae; outer plate armed on inner margin with about nine slender, curved teeth, and distally with slender, curved plumose spines and setae; palp with second joint reaching a little beyond outer plate.

The gnathopod 1 (pl. VIII, fig. 7) has the sixth joint a little shorter than the fifth joint. The coxal plates are produced forward to an acute angle. The gnathopod 2 (pl. VIII, figs. 8 and 9) on either side vary much in size, the one on the right side being much enlarged. The second joint is long and the third joint is very short. The fourth joint has the inner distal end slightly produced, the fifth is much compressed. The sixth joint is very long and has got small spines on the inner margin. The seventh joint is slightly curved, straight and long. The gnathopod 2 in the left side is much smaller and also varies in shape especially in the fifth and sixth joints as shown in the diagrams.

Peraeopods 1 and 2 (pl. VIII, figs. 13 and 14) are slender and are shorter than the remaining ones. The second joint is the stoutest and bears a few long setae about the inner margin. Peraeopods 3–5 (pl. VIII, figs. 10, 11 and 12), second joint rather expanded.

Peraeon with a few small setae on the dorsal surface (4—6). The third pleon segment is serrate along the posterlo-dorsal margin. The peraeon segments are smooht on dorsal surface. The pleon segments are serrate along the posterio-dorsal margins of the segments.

Uropod 1 (pl. VIII, fig. 15) much longer than uropod 2 (pl. VIII, fig. 16). Uropod 3 (pl. VIII, fig. 17), rami rather very broad and provided with spines and setae on the margins. The telson (pl. VIII, fig. 18) not reaching to the end of the peduncle of uropod 3 and is deeply cleft. It has one long and two or three short spines on each lobe and two plumose setules on each lateral margin.

Size.—Length of the male from the front of the head to the end of the uropod is about 12 mm.

21. Quadrivisio bengalensis (Stebbing).

(Plate IX, figs. 1—19.)

Quadrivisio bengalensis Stebbing, 1907, p. 160, pl. vii.
Quadrivisio bengalensis Chevreux, 1913, p. 15, fig. 1.
Quadrivisio bengalensis Chilton, 1921, p. 537, fig. 6.
Quadrivisio bengalensis Chilton, 1925, p. 534.
Quadrivisio bengalensis Barnard, 1935, p. 287.
Quadrivisio bengalensis Schellenberg, 1938, pp. 63–65.

Locality.—Eight specimens, both male and female, of this species were obtained from a collection made at Adyar backwaters on 11th November, 1949. They were found near the San Thome bridge clinging to some floating algae.

Distribution.—This species has been recorded from the brackish pools at Port Canning, Lower Bengal (Stebbing 1907); British East Africa, Zanzibar (Chevreux 1913); Chilka Lake (Chilton 1925); Tale Sap (S.E. Siam) (Chilton 1925); Vizagapatam and Travancore (Barnard 1935) and from the Pacific Ocean (Schellenberg 1938). This is the first record of this species from Madras Coast.

Description.—The head is much longer than the first segment of peraeon. The ocular lobes are rounded. The side plates second and third are rather deeper than the first and fourth. Eyes dark, placed near the margin of the head, all with numerous lenses, the lateral pair rounded, the dorsal pair crescent-shaped, with the concavity in front. Antenna 1 (pl. IX, fig. 1) second joint longer than the first joint in the male but sub-equal in female; third joint small; flagellum more than three times longer than the peduncle; 43—50 jointed; accessory flagellum about 8—10 jointed. Antenna 2 (pl. IX, fig. 2) peduncle elongate; gland-cone prominent, fifth joint in male considerably longer than the fourth joint, both slightly curved; in the female the fifth joint straight, not longer than the fourth, the flagellum shorter than the peduncle, 20—22 jointed. Mandible (pl. IX, fig. 3) with spines of spine row numerous, molar strong, palp with third joint slightly longer than the second, tipped with two long setae. Maxilliped (pl. IX, fig. 6) outer plate reaching nearly the middle of the palp's long second joint.

Gnathopod 1 (pl. IX, figs. 8 and 18) alike in both the sexes, second joint long, fifth joint is considerably larger than the sixth, strongly fringed on and near the hind margin with groups of spines planted on the inner surface ; the sixth joint oblong, oval ; the palm very short, transversely rounded, not overlapped by the small finger. Gnathopod 2 (pl. IX, fig. 7) in the male has the distal end on the hind margin produced to a sharp apex, the fifth joint is cup-shaped distally, the sixth longer and much broader than the second, with smooth, nearly straight front margin, the hind margin slightly setose and denticulate till it meets the very oblique palm, over which the powerful finger closes, leaving two gaps, a small one near the hinge and a long one near the hind margin, with a squared denticulate process between them. In the female (pl. IX, fig. 19) fifth joint cup-like, longer than the second, the lower margin and most of the front carrying numerous spines, the palm spinulose, oblique, leaving no gap between it and the closed finger.

Peraeopods 1 and 2 (pl. IX, figs. 9 and 10) are slender. Peraeoped 3 (pl. IX, fig. 11) longer than the first two, the sixth joint is rather very slender and is without setae. Peraeopods 4 and 5 (pl. IX, figs. 12 and 13) second joint is expanded, sixth joint longer than the fifth, finger not very large.

Uropod 1 (pl. IX, fig. 14) peduncle shorter than the equal rami, both rami and the peduncle are provided with spines on the upper margins. Uropod 2 (pl. IX, fig. 15) much smaller than the uropod 1, peduncle about as long as the sub-equal rami. Uropod 3 (pl. IX, fig. 16) extends much beyond the second, the elongate oval rami being only a little unequal and fringed with numerous little spines and setules. The telson (pl. IX, fig. 17) is small and is not so long as broad. It is divided to the base, each lobe having several little spines down the inner margin, and some of those round the apex.

Remarks.—Stebbing 1907, has described the flagellum of the antenna 1, barely as long as peduncle, having in male more than twenty joints. But the flagellum of the antenna 1 of the specimens that were collected from Adyar were about three times as long as the peduncle and were composed of about 45—50 joints.

22. Elasmopus pectenicrus (Bate).

(Plate IX, figs. 20—35.)

Moera pectenicrus Bate, 1862, p. 192, pl. 34, fig. 8.
Elasmopus serrula Walker, 1904, p. 277, pl. 8, fig. 34.
Elasmopus serrula Walker, 1909, p. 336.
Elasmopus pectenicrus Barnard, 1916, p. 197, pl. 28, fig. 33.
Elasmopus pectenicrus Gravely, 1927, p. 123.
Elasmopus pectenicrus Schellenberg, 1928, p. 647.
Elasmopus pectenicrus Shoemaker, 1935, p. 238.
Elasmopus pectenicrus Pirlot, 1936, p. 312.
Elasmopus pectenicrus Barnard, 1937, p. 161.

Localities.—This species, both male and female, is found occurring throughout the year, attached to algae found on the buoys at the Madras harbour. Specimens of this

species were also collected from the Krusadai Island, Gulf of Manaar. Recorded localities in Indian Ocean—Red Sea (Kossmann, Spandl); Ceylon, Zanzibar, Suez (Walker); Krusadai Island (Gravely); Suez and Dar-es-Salaam (Schellenberg).

Distribution.—This is a cosmopolitan species and has been recorded from New Guinea; South Africa; East Indies and Porto Rico.

As a complete description of this species has been given by Bate (1862) only the salient features are briefly recounted here.

Salient features.—(Plate IX, figs. 20—35). Eyes small, irregular. Antenna 1 (pl. IX, fig. 20) scarcely half the length of the animal; peduncular joints sub-equal; flagellum as long as the peduncle; accessory flagellum two jointed. Antenna 2 (pl. IX, fig. 21) scarcely as long as the peduncle of the first antenna; flagellum scarcely longer than the last joint of the peduncle.

Peraeopod 4 having the second joint abruptly narrowing posteriorly towards the distal extremity, and the inferior half of the margin being developed into a comb-like fringe which is very characteristic of this species.

The female differs from the male in having the second pair of gnathopod somewhat smaller and less hairy.

Size.—Length of the male from front of the head to the end of the uropods is about 5–7 mm.

Family TALITRIDAE.

23. **Talorchestia martensii** (Weber).

(Plate X, figs. 1—9.)

Talorchestia martensii Stebbing, 1906, p. 583.
Talorchestia martensii Chilton, 1921, pp. 541–545, fig. 8.
Talorchestia gracilis Chilton, 1925, p. 535.
Talorchestia gracilis Gravely, 1927, p. 123.
Talorchestia martensii Barnard, 1935, pp. 289–290.

Locality.—More than one hundred and thirty specimens, both male and female, of this species were collected from the banks of Cooum and Adyar rivers. Thirty-two specimens were also collected from Krusadai Islands (30th January, 1950).

Distribution.—This has been recorded from Flores, East Indies, Chilka Lake, Gulf of Manaar, Tale Sap, Siam, Vizagapatam and Travancore Coast.

Description.—Male : Pleon segment three having posterio-lateral corner with produced point. Antenna 1, short; peduncle longer than the flagellum, 1st and the 2nd joints with anterior distal end produced forwards; flagellum 5 jointed. Antenna 2, peduncle rather very long, ultimate joint longer than the penultimate; flagellum 20 jointed.

Gnathopod 1 (pl. X, fig. 2) 2nd joint long ; 5th joint longer than 3rd and 4th combined, inner distal end produced to a narrow small lobe ; 7th joint long, reaching far beyond the rounded lobe. Gnathopod 2, (pl. X, fig.3) large ; 2nd joint long, anterior margin with small spinules ; 6th about as long as the 2nd; palm slightly convex, a little longer than the hind margin and provided with a double row of stout spinules ; a few spinules on the hind margin; anterior margin convex and free from spinules ; 7th joint long.

Peraeopod 1 longer than peraeopod 2 (pl. X, fig. 4) ; second joint, longer than the rest of the joints. Peraeopods 3—5 (pl. X, fig. 5) 2nd joint expanded, anterior margin slightly convex, posterior rather straight with rounded corners; all the joints provided with spines on both the margins.

Uropod 1, peduncle longer than the sub-equal rami; inner ramus with spinules on the upper margin ; the outer ramus is devoid of spinules on both the margins ; both the rami with 3—4 spinules at the tip. Uropod 2 (pl. X, fig. 6) smaller than uropod 1, rami shorter than the peduncle; both rami and peduncle provided with spinules on the upper margin. Uropod 3 (pl. X, fig. 7) peduncle longer than the ramus. Telson narrow towards the extremity ; each lobe bears spinules along the posterior part of its lateral margin and at the extremity.

Female.—The female differs from the male in Gnathopods. Gnathopod 1, (pl. X, fig. 8) 5th joint long, but without a distal lobe ; 6th narrowing distally and without a definite palm. Gnathopod 2 (pl. X, fig. 9) 2nd joint is much broader at the middle, anterior margin convex and fringed with a number of short spinules; the 5th joint with a posterior angular lobe ; the 6th with lobe at the distal end which extends far beyond the diminutive finger.

Size.—Length of the male from front of the head to the end of the uropods is about 9 mm. and that of the female is about 8 mm.

Remarks.—The specimens that have been collected and examined from Madras agree with Chilka Lake form, figured by Chilton (1921). But Chilton (1925) has referred it to Dana's *T. gracilis*. The drawings made from the specimens collected from Madras have been compared with the original figures of *T. gracilis* by Dana (1853) and also with the figures of Bate (1862), and the following differences have been noticed :—

Talorchestia gracilis (Dana) has got the antenna 2, thirty jointed in the male while in the specimens examined here the antenna 2 has not more than 23 joints. The gnathopod 1 also differs from Dana's diagrams and description in having a rounded process at the inner distal end on the 5th joint. Again the 2nd joint of the peraeopods 3—5 in *T. gracilis* (Dana) are narrowed apically while in the other they seem to be rather broader than what Dana and Bate have shown in their diagrams.

Barnard (1935) has referred his specimens collected from the Travancore Coast to *T. martensii* (Weber) and has included Chilton (1921) and (1925), as synonymous with *T. martensii*. From the above mentioned points it is clear that the Madras species is *Talorchestia martensii* (Weber).

24. Hyale hawaiensis (Dana).

(Plate X, figs.10—24.)

Allorchestes hawaiensis Dana, 1853, p. 900, Taf. 61, fig. 5.
Hyale brevipes Shoemaker, 1933, p. 18, fig. 10 and 11 (literature).
Hyale brevipes Barnard, 1935, p. 292.
Hyale hawaiensis Schellenberg, 1938, p. 66, fig. 34.
Hyale hawaiensis Shoemaker, 1942, p. 18.

Locality.—This species occurs at Cooum and Adyar Rivers and has also been obtained from Ennur and Mandapam.

Distribution.—The occurrence of this species has been recorded from Hawai, Seychelles, Ceylon, Maladives, Tale Sap (Siam), Vizagapatam, Travancore, Cochin, Suez, West-Indies, Narborough Island and Galapagos Islands.

Description.—The side-plates are of moderate size. Antenna 1 (pl. X, fig. 21) much more slender than that of antenna 2; nearly $\frac{1}{4}$ the length of the body ; flagellum 14—18 jointed; joints long and slender, setae about as long as breadth of joints. Antenna 2 (pl. X, fig. 22) peduncle twice as long as the peduncle of antenna 1 ; joints of the flagellum oblong ; setae few and half as long as breadth of joints.

Gnathopod 1 (pl. X, fig.13) in male second joint rather elongate, fourth joint longer than the 3rd, fringed with a few setae at the distal end; 5th joint lower distal end produced between the 4th and the 6th joints ; anterior distal end with 2 spines pointing forwards; sixth joint anterior margin nearly straight, palm oblique and nearly longitudinal ; seventh joint inner margin with small spines, base slightly bulged out. Gnathopod 2 (pl. X, fig. 14) second joint long and is nearly as long as the sixth ; lower margin without any spines except a small one at the distal end ; fourth joint longer than third and with two or three small spines at the inner distal end ; sixth joint rather very large, ovate, palm very oblique so as to be nearly longitudinal, sparingly setose ; fifth joint not produced between the fourth and sixth. Gnathopod 1 (pl. X, fig. 23) in female much smaller than that of the male but resembles it very much. Gnathopod 2 (pl. X, fig. 24) fifth joint (female) is produced below between the fourth and sixth joints ; sixth joint narrowed towards the distal end.

Peraeopods 1 and 2 (pl. X, fig. 15) almost of the same shape and size. Peraeopods 3—5 (pl. X, fig. 16) increase in length successively ; second joint expanded.

Uropod 1 (pl. X, fig. 17), peduncle longer than the sub-equal rami ; both rami and peduncle are provided with spines on the upper margins. Uropod 2 (pl. X, fig. 18) peduncle shorter than the rami. Uropod 3 (pl. X, fig. 19) uniramous, peduncle with a single spine at the outer distal end ; rami with 6 to 8 short spines at the apex.

Size.—Length of the male from front of the head to end of the uropods is about 6—8 mm.

25. Hyale honoluluensis (Schellenberg).

(Plate XI, figs. 1—9.)

Hyale honoluluensis Schellenberg, 1938, p. 69, fig. 35.

Locality.—Nearly eighty specimens, both males and females, were collected from the concrete blocks found outside the harbour. These amphipods are found clinging to the green algae growing on the concrete blocks.

Distribution.—This species has been previously recorded from Honolulu by Schellenberg (1938). This is the first record of this species from India.

Description.—Male : The head with latreal lobes short ; eyes medium-sized and rounded. The antenna 1 reaches almost up to the middle of the flagellum of antenna 2 ; the peduncle short and is about 1/3 the length of the flagellum; flagellum 14—16 jointed ; joints carry at the end one to two sensory filaments. The antenna 2, about as long as the body ; flagellum composed of about 24—28 joints.

Gnathopod 1 (pl. XI, fig. 2) smaller than gnathopod 2 ; the 2nd joint lobed at the distal end ; 5th joint produced between the 4th and 6th joints at the distal end on the posterior side ; 7th joint developed, slightly curved. The first coxal plate longer than broad. Gnathopod 2 (pl. XI, fig. 1), 2nd and 3rd joints with lobes at the distal ends, 6th joint distally running smaller with a small lobe at the posterior distal end ; its posterior margin fringed with small spines of different lengths ; 7th joint long and curved with small spines on the inner margin. The second coxal plate with posterior margin acutely angled.

Peraeopods 1 (pl. XI, fig. 3) and 2 alike. Peraeopods 3, 4 and 5 (pl. XI, fig. 4) with usual structure ; slender and not particularly broadened ; the joints provided with spines ; the end of 6th joint with long and short spines. The posterior margin of peraeopod 5 is quite shallow and widely crenate.

Uropod 1 (pl. XI, fig. 5) peduncle and rami provided with lateral spines on the dorsal side ; both the rami with 3 or 4 terminal spines. Uropod 2, smaller than uropod 1 ; uropod 3 (pl. XI, fig. 6) ramus somewhat shorter than the peduncle ; both with spines at the end. Telson (pl. XI, fig. 7) cleft almost up to the end ; each half of the cleft pointedly triangular.

The female is just like the male except in gnathopods as shown in the diagrams (pl. XI, figs. 8 and 9).

Size.—Length of the male from front of the head to the end of the uropods is about 4–6 mm.

Family PHOTIDAE.

26. Microprotopus maculatus Norman.

(Plate XI, figs. 10—22.)

Microprotopus maculatus Della Valle, 1893, p. 393, t. 56, f. 13—16.
Microprotopus maculatus Sars, 1894, p. 567, t. 201.
Microprotopus maculatus Stebbing, 1906, p. 604 (literature).

Locality.—Three males and four females belonging to this species were collected from a dredge collection made on 12th December, 1948 at Madras inshore area.

Distribution.—This species has been previously recorded from the North Atlantic Sea and adjoining seas. This is the first record of this species from India.

Description.—Body short and stout, with broadly rounded back. Side-plates 1–4 strongly setiferous, 1st and 2nd wider in male than in female. Eyes small, round, dark. Antenna 1 (pl. XI, fig. 10) longer than antenna 2 ; peduncle shorter than the flagellum ; flagellum 17 jointed, sensory filaments present almost on all segments ; accessory flagellum short, 3 jointed. Antenna 2 (pl. XI, fig. 11) peduncle longer than the flagellum ; ultimate and the penultimate joints of the peduncle sub-equal ; flagellum 10 jointed.

Gnathopod 1 (pl. XI, fig. 15) rather small, 5th joint shorter than 6th ; the lower end sligthly bulged out, fringed with setae ; 6th joint narrowly oval, more widened distally on the lower side in male than in female, palm defined by an obtuse angle. Gnathopod 2 (pl. XI, fig. 16) in male second joint long, 4th longer than 3rd joint, 5th joint short, broad, cup-shaped ; 6th joint very long and large, front margin convex, hind margin straight between a projection at the base and a distal blunt tooth ; between the tooth and the tip of the joint is a cavity ; 7th joint rather very long, reaching nearly the base of the preceding joint. Gnathopod 2 (pl. XI, fig. 22) in female stouter than gnathopod 1 ; 5th joint triangular, the distal end on the lower side produced to a small lobe ; 6th broader than in gnathopod 1, palm more defined.

Peraeopods 1 (pl. XI, fig. 17) and 2 alike, slender ; the distal end of the 4th joint produced at the upper side ; 7th joint curved. Peraeopod 3–5 (pl. XI, fig. 18) increasing in length ; 5th the longest ; 2nd joint broad ; 4th joint upper distal end produced ; 6th joint broader towards the distal end ; 7th joint curved.

Uropod 1 (pl. XI, fig. 19), rami shorter than peduncle ; both rami and peduncle provided with small spines on both the margins. Uropod 2, like uropod 1, but much shorter. Uropod 3 (pl. XI, fig. 20), peduncle rather stout, ramus sub-equal to it in length, upper with spines. Telson broader than long, distally truncate.

Size.—Length of the male from front of the head to the end of the uropods is about 4 mm.

27. Cheiriphotis megacheles (Giles).

(Plate XI, figs. 23—25.)

Melita megacheles Giles, 1885, p. 70, pl. iii.
Eurystheus hirsutus Giles, 1887, p. 227, pl. viii.
Cheiriphotis megacheles Walker, 1904, p. 284, pl. vi, figs. 42.
Cheiriphotis walkeri Stebbing, 1910 a, p. 461.
Cheiriphotis walkeri Stebbing, 1918, pp. 47–48.
Cheiriphotis durbanensis Barnard, 1916, p. 247.
Cheiriphotis megacheles Schellenberg, 1926, p. 381.
Chieriphotis delloei Pirlot, 1934, p. 231.
Cheiriphotis megacheles Barnard, 1937, p. 167.

Locality.—Four specimens of this species were collected from the dredge collections made at Madras inshore area on 12th February, 1949.

Distribution.—This has been previously recorded from Bay of Bengal (Giles); Ceylon (Walker); South Africa; East Indies and South Arabian Coast.

Description.—Head not as long as the first two segments combined; occular lobe moderately produced. Antenna 1 (pl. XI, fig. 23), peduncle sub-equal to that of antenna 2: first joint shorter and wider than the second; flagellum rather variable in length, about 13—15 jointed; accessory flagellum in male 5 jointed; in female 4 jointed. Antenna 2, rather stronger than the antenna 1; flagellum 9 jointed.

Gnathopod 1 (pl. XI, fig. 24) side-plates acutely produced in front and fringed round the blunt point and below with long setae. The second joint as long as the fifth; sixth joint with the hind margin evenly convex, with no definite palm; seventh about half as long as the hind margin. Gnathopod 2 in female, side-plates small sub-quadrate, angles rounded, lower margin fringed with long setae. Second joint very strong, sub-equal to the hand, with long setae on the front margin; palm uneven, defined by a strong tooth just below the point of the dactylus. In male (pl. XI, fig. 25) the first joint is shorter, the width being three-fourths of the length; fifth joint is rather reduced very much; sixth joint sub-quadrate; the proximal part of the front margin is very convex and fringed with long plumose setae; palm rectangularly transverse, defined by a sharp tooth with 5 equidistant, irregular teeth between it and the hinge of the dactylus.

Peraeopod 1, rather longer than the first 3 joints of the 2nd gnathopod in the male, and as long as the whole limb in the female; 2nd joint curved in the male, straight in the female. Peraeopods 3—5 increase in length successively, the last pair extending beyond the uropods.

Uropod 1, extends a little beyond the 2nd, and 2nd beyond the 3rd; in the 1st and 2nd the rami are sub-equal and shorter than the peduncles, all the parts being spinous. Uropods 3, outer ramus shorter than the peduncle. Telson squarely truncate when seen from above with 3 to 4 setae in each angle.

Size.—Length of the male from front of the head to the end of the uropods is about 4—5 mm.

28. Photis longicaudata (Bate & Westwood).

(Plate XII, figs. 1—7.)

Eisciadus longicaudatus Bate and Westwood, 1862, p. 412.
Photis longicaudata Sars, 1894, p. 571, pl. 203, fig. 1.
Photis longicaudata Walker, 1904, p. 286, pl. 6, fig. 43.
Photis longicaudata Schellenberg, 1926 a, p. 231.
Photis longicaudata Schellenberg, 1928, p. 662.
Photis longicaudata Barnard, 1937, p. 164.
Photis longicaudata Shoemaker, 1945, p. 11, fig. 5.

Locality.—Sixteen female and three male specimens of this species were obtained from a dredge collection made at the Madras inshore area on 6th December, 1949.

Distribution.—This species has been recorded from Northern Europe; Mediterranean; Gulf of Guinea (Schellenberg); Suez Canal (Schellenberg); South Arabian Coast (Barnard); British East Africa and Seychelles (Walker); Ceylon (Walker) and Gulf of Mexico, Tortugas, and Florida (Shoemaker). This is the first record of this species from India.

Description.—Body rather slender. Side-plates not very deep. Head with lateral lobes greatly projecting, narrowly rounded. Side-plates 5 distally narrowly rounded. Eyes small, rounded, close to the margin of lateral lobes of the head. Antenna 1 (pl. XII, fig. 1) small, peduncle sub-equal to flagellum, flagellum 6—8 jointed; setose On the lower margin. Antenna 2 (pl. XII, fig. 2) flagellum 4—6 jointed, setose on the lower margin.

Gnathopod 1 (pl. XII, fig. 3) 5th joint not greatly widened distally, about as long as 6th which widens to the oblique, obtuse-angled palm. Gnathopod 2, in male 2nd joint produced into a rounded decurrent lobe at distal front corner; 5th joint cup-shaped, 6th widening to the palm, which is defined by a projecting angle.

Peraeopods 1 (pl. XII, fig. 5) and 2 slender, 2nd joint smaller; 4th distal end produced forwards and provided with setae; 6th joint very narrow. Peraeopod 5 (pl. XII, fig. 6) longer than the rest of the peraeopods.

Uropod 3. peduncle longer than the rami, rami sub-equal, outer rami the longer. Uropod 2 like uropod 1, but smaller. Both the uropods are devoid of any spines on the margins. Uropod 3 (pl. XII, fig. 7) outer ramus longer than the peduncle; 2nd joint tipped with 2 or 3 slender setae. Telson very small, broader than long, sub-triangular, with small process on each side of the apex.

Size.—Length of the male from front of the head to the end of the uropods is about 4—6 mm.

29. **Photis digitata** Barnard.

(Plate XII, figs. 8—24.)

Photis longicaudata Chilton, 1921, p. 554, fig. 12 (*longicaudata non* Bate & Westwood).
Photis digitata Barnard, 1935, pp. 302-303.

Locality.—Fourteen female and twelve male specimens of this species were collected from the rocks under the San Thome Bridge at Adyar. These small amphipods were found clinging to green algae growing on the rocks, and were covered by the very fine sediment which settles on these rocks.

Distribution.—This has been recorded from Chilka Lake by Chilton (1921) and from Travancore Coast by Barnard (1937).

Description of the Male.—Head, lateral lobes moderately produced with front margin blunt and evenly rounded. Eyes small, round or slightly oval, black. Antenna 1 (pl. XII, fig. 8), a little longer than antenna 2; first joint of the peduncle thick, sub-equal in length to the third, the second joint longer, flagellum 7 jointed, some carrying very slender sense organs. Antenna 2 (pl. XII, fig. 9) shorter than the peduncle and consisting of 5 to 6 joints. Mandible (pl. XII, fig. 10) molar strong and prominent; cutting edge toothed; 4 spines in spine row; palp with third joint over $\frac{3}{4}$ the length of second, apically rounded and bearing groups of spines; second joint bearing a few scattered spines on inner margin. Maxilla 1 (pl. XII, fig. 11) inner plate reduced to a small conical lobe without setae; outer plate reduced to a small conical lobe without setae; outer plate armed with 10 spine teeth; palp bearing on the obliquely truncate apex 3 spine teeth and 3—4 setae. Maxilla 2 (pl. XII, fig. 12) outer plate wider and longer than inner; inner and outer plates are fringed apically with setae. Maxillipeds (pl. XII, fig. 13) inner plate reaching nearly to the middle of the outer plate and bearing 10 spines on the upper margin; outer plate reaching nearly to the end of the second joint of palp and armed on upper inner margin and rounded distal margin with spine teeth and a few curved pectinate spines; third joint of the palp short and narrow; fourth joint rather small and bear one or two prominent nails. Lower lip with lateral lobes rather small and slender; inner lobes very large.

Gnathopod 1 (pl. XII, fig. 14) coxal plate somewhat produced forwards; second joint rather stout and thick; fifth joint nearly as long as sixth, lower margin over half the length of the upper; sixth joint slightly longer than fifth; palm very oblique, slightly concave, not defined by spines, and continued into the hind margin of the joint by an even curve; seventh joint curved and bearing a single small tooth towards the apex. Gnathopod 2 (pl. XII, fig. 15) second joint rather long and slender; fifth joint with the lower distal end produced forward and bears at its tip a few setae; sixth joint twice as long as broad, upper margin smooth and slightly convex, palm defined by a fairly conical protuberance and a smaller one very near to the base of the seventh joint; seventh joint well developed, curved with small spines and setae on the inner margin.

Peraeopod 1 (pl. XII, fig. 16) longer and stouter than peraeopod 2 ; second joint even, slightly longer than third and the fourth together ; fourth joint expanded and clothed with long setae ; fifth joint shorter than sixth and both combined, equal in length to the fourth. Peraeopod 2 (pl. XII, fig. 17) in general much like peraeopod 1, but does not bear any setae on the dorsal side of the fourth joint excepting a single one at the distal end. The second joint bears a few plumose setae at the distal end. Peraeopod 3 (pl. XII, fig. 18) shorter and assuming the usual upward-pointing position characteristic of the genus *Photis* ; the second joint is broad at the base and tapering towards the distal end ; the three following joints are short and wide ; the sixth joint is narrower being twice as long as wide ; the seventh joint with the bent apex and two small outer teeth found in this genus. Peraeopods 4 and 5 almost of the same length and are longer than third. Peraeopod 4 assumes much the same position as peraeopod 3, though not pointing so sharply upwards ; second joint not as greatly expanded as in peraeopod 3 ; the seventh joint is much like that of 3rd. Peraeopod 5 (pl. XII, fig. 19), 2nd joint less expanded than that of fourth ; seventh slightly curved and long.

Uropod 1, extending back as far as 3rd or perhaps a little further. Uropod 3 extending back not quite so far as 2. Uropod 1 (pl. XII, fig. 20) peduncle longer than the unequal rami ; outer ramus shorter than the inner ; the inner margins and the outer margins of both the rami are crenulate ; the outer ramus with 2 spines and the inner with 3 spines ; the outer edge of the peduncle bears five lateral spines, and inner edge bears only one terminal spine. Uropod 2, outer ramus shorter than inner and crenulate on both the margins on the distal half and the inner ramus devoid of any spines ; the peduncle bears two spines on the outer edge and one terminal spine on the inner edge. Uropod 3 (pl. XII, fig. 21) outer ramus slightly longer than the peduncle, second joint very short and armed with two long and two short spines, inner ramus very small and bearing a very small apical spine. Telson triangular.

Female.—The female is very much like the male in general appearance. The gnathopods (pl. XII, figs. 23 and 24) are not so strong and robust as in the male. The palm of the second gnathopod very oblique, slightly concave, and defined by a low, evenly rounded angle ; seventh joint armed on inside margin with a fine teeth.

Family AMPITHOIDAE.

30. **Ampithoe inda** (M. Edwards).

(Plate XIII, figs. 1—11.)

Amphithoe inda Milne Edwards, 1830, p. 376.
Amphithoe indica Giles, 1888, p. 240, t. 10, f. 1–7.
Ampithoe inda Stebbing, 1906, p. 640.

Locality.—More than one hundred and fifty specimens, both male and female, were collected from the rocks just outside the Madras harbour and also from Royapuram shore. These are found clinging to the green algae that are found growing on the rocks. They also have the same colour as that of the algae.

Distribution.—This has been previously recorded from the Sooloo Sea and also from the Bay of Bengal (Giles).

Description.—Body is rather short. Side-plates 1–5 broad. Antenna 1 (pl. XIII, fig. 1) peduncle rather short; 1st joint of the flagellum stout, longer than the second; third very short; flagellum rather long, 25—27 jointed. Antenna 2 (pl. XIII, fig. 2) peduncle longer than the flagellum; penultimate joint of the peduncle shorter than the anti-penultimate; flagellum 14—17 jointed.

Gnathopod 1 (pl. XIII, fig. 6) 2nd joint longer than the succeeding 2 joints combined, distal end on the upper margin slightly bulged out to a small lobe; 5th shorter than the 6th, lower side slightly produced; 6th joint oblong, narrow at apex. Gnathopod 2 (pl. XIII, fig. 7) 2nd joint with the anterior distal corner bulged out; 5th joint rather triangular, lower distal end produced between the 4th and 6th; 6th joint stout, broad, sub-rectangular; palm transverse; finger moderately large and somewhat serrate.

Peraeopods 1 (pl. XIII, fig. 8) and 2 alike, second joint not much widened; peraeopod 3 (pl. XIII, fig. 9) 2nd joint broad. Peraeopods 4 and 5 much longer, with 2nd joint somewhat less broad. Peraeopods 3—5, distal end of the 6th joint with 2 blunt spines, including between them a rounded depression.

Uropod 1 (pl. XIII, fig. 10) peduncle longer than the rami, both rami and peduncle provided with spines. Uropod 2 smaller than uropod 1. Uropod 3 (pl. XIII, fig. 11) peduncle long; outer ramus with 2 reverted spines; inner ramus with one spine and a few setules. Telson, small, laminar and triangular.

Size.—Length of the male from front of the head to the end of the uropods is about 5—6 mm.

31. **Grubia filosa** (Savigny).

(Plate XIII, figs. 12—19.)

Ampithoe filosa Stebbing, p. 641, 1906.
Grubia filosa Schellenberg, 1928, pp. 666–668, fig. 203 (literature).
Grubia filosa Shoemaker, 1935, p. 245, figs. 4, 5.
Grubia filosa Barnard, 1937, pp. 171–172.

Locality.—Two specimens of this species were collected from the Madras harbour on 13th July, 1949. More than sixty specimens, both male and female, were collected from the Sponge Bay, Krusadai Islands and about twenty specimens from Mandapam.

Distribution.—This has been recorded from the East Coast of America, Mediterranean, Indian Ocean, East Coast of Australia and Suez Canal.

Description.—Head as long as first two segments combined; eyes large, well developed. Antenna 1, flagellum longer than the peduncle; peduncle first joint sub-equal to the second, 3rd joint the shortest; flagellum 15—20 jointed. Antenna 1, flagellum much longer than the peduncle.

Gnathopod 1 in female 4th joint longer than the 3rd, distal end with few long setae; 5th joint smaller than the 6th; 6th joint with the lower margin bulged out at the middle and provided with long and short setae; 7th joint well developed, slightly curved. Gnathopod 2 larger than gnathopod 1, 5th joint lower margin produced between the 4th and the 6th joints; 6th joint palm well differentiated.

Peraeopod 1 (pl. XIII, fig. 12) and 2 almost of the same shape and size; second joint longer than the fourth and fifth joints combined. Peraeopods 3—5 (pl. XIII, figs. 13 and 14) increase in length successively, second joint not expanded much.

Uropod 1 (pl. XIII, fig. 15) peduncle longer than the inner ramus, provided with nearly 7—8 spines on the inner margin; inner ramus longer than the outer; both the rami with 3—4 spines at the apex. Uropod 2 smaller than uropod 1, peduncle with 3 spines each on inner and outer margins. Uropod 3 (pl. XIII, fig. 16) peduncle longer than the rami.

Size.—Length of the male from front of the head to the end of the uropods is about 10 mm.

Family COROPHIIDAE.

32. **Grandidierella bonnieri** Stebbing.

(Plate XIV, figs. 1—5.)

Grandidierella bonnieri Stebbing, 1908, p. 120, pl. 6.
Grandidierella megnae Chilton, 1921, p. 548.
Urciolella lunata Schellenberg, 1928, p. 669, fig. 207.
Grandidierella megnae Stephensen, 1933, p. 434.
Grandidierella bonnieri Barnard, 1935, p. 299, figs. 12 d. and 13 b.
Grandidierella megnae Panikkar and Aiyar, 1937, p. 294.
Grandidierella bonnieri Shoemaker, 1948, p. 11.

Locality.—This species was found occurring in large numbers throughout the year, attached to the algae in the Cooum River and also at Adyar backwaters.

Distribution.—This species has been recorded from the brackish pools at Port Canning, Lower Bengal, Stebbing, 1908 : Chilka lake (*G. megnae*), Chilton, 1921; Suez Canal (*Urciolella lunata*), Schellenberg, 1928; Island of Bonaire, Stephensen, 1933 : Vizagapatam, Cochin and Travancore, Barnard, 1935; Brazil, Schellenberg, 1938; Adyar backwaters, Panikkar and Aiyar; Cuba, Shoemaker, 1937, and from the West Indian and Caribbean regions, Shoemaker, 1948.

Description.—(pl. XIV, figs. 1—5). The head is without rostrum. The lateral lobes of the head are rounded. Eyes are small, rounded and are moderately compressed. The side plates of the first two segments are somewhat square with rounded corners. The posterio-lateral corners of the third pleon segment are rounded with a minutely rounded point. The next three segments are each shorter than the third, decreasing in succession.

The antenna 1 is about as long as the body. The first joint of the peduncle is rather stout and armed below with a spaced row of spines. Stebbing (1908) has described two spines singly and three in a group. Again Stebbing (1908) has drawn and described the second joint of the peduncle as long as the first, but much narrower. But here it was found that the second joint was much longer than the first. (Stebbing 1908) has said that the flagellum is longer than the peduncle, with fifteen unequal joints in a male and eighteen in a female specimen. But the specimens that were studied here were found to have the flagellum a little shorter than the peduncle, with 18 unequal joints in a female and 22 in a male specimen. The accessory flagellum is microscopically small Stebbing (1908) and in the young ones that were examined here, were never found to have the accessory flagellum nearly as long as the first joint of the flagellum as stated by Chilton (1921). Antenna 2 as described by Stebbing (1908) excepting that the flagellum of the female has five joints.

Gnathopod 1 in male, second joint moderate, lower margin rounded, fifth joint not narrowing distally, a strong spinous projection on inner apical corner, a small one on distal margin, and a small one on lower margin at about 2/3 length ; sixth joint, narrow at base, distally somewhat expanded and rounded ; seventh not longer than sixth, somewhat expanded on inner margin proximally, outer margin nearly straight. The gnathopod 2 in the male and gnathopods 1 and 2 in females as given by Chilton (1921).

Salient feature.—A medio-ventral spiniform backwardly directed process on peraeon segment 1 in (adult) male and a smaller one on segment 2.

Remarks.—This species was first recorded and described by Stebbing (1908), from brackish ponds in the Lower Bengal. Chilton (1921) referred his specimens collected from Chilka Lake to *Grandidierella megnae* (Giles) and included *Grandidierella bonnieri* Stebbing as a synonym of it. By following Chilton (1921) Panikkar and Aiyar (1937) also referred the specimens that were collected from Adyar as *Grandidierella megnae* (Giles). Barnard (1935) re-opened, the question of the synonymy of *Grandidierella megnae* (Giles) which Chilton had apparently so satisfactorily settled and has pointed out that the species that Chilton had described as *Grandidierella megnae* (Giles) was actually *Grandidierella bonnieri* Stebbing.

33. **Grandidierella gilesi** Chilton.

(Plate XIV, fig. 6.)

Grandidierella gilesi Chilton, 1921, pp. 552–554, fig. 11.
Grandidierella gilesi Chilton, 1925, p. 537.
Grandidierella gilesi Barnard, 1935, p. 33.
Grandidierella gilesi Panikkar and Aiyar, 1937, p. 294.

Locality.—Four specimens of this species, both male and female, were collected from the brackish water at Adyar. This species is found usually attached to the green algae found floating in the waters.

Distribution.—This species was described by Chilton from Chilka Lake (1921) and it has since been recorded from Tale Sap (Chilton); Patani River, Siamese Malay States, Vizagapatam (Barnard); and from Adyar backwaters (Panikkar and Aiyar).

Description.—This species resembles very much *Grandidierella bonnieri* Stebbing, in the general shape of the body, antennae, peraeopods, etc., but differs considerably in the gnathopods.

Male.—The first gnathopod is complexly subchelate having the 5th joint greatly dilated; the second joint is broad, third and fourth are short, the fourth bearing on its hind margin a fringe of long plumose setae; the fifth joint very large, oval; but having the posterio-distal angle produced into a sharp tooth; on the fifth joint between this tooth and the base end of the sixth joint is a triangular projection; the lower margin of the fifth joint bears a very distinct fringe of very long plumose setae and there is another slightly oblique row on the surface of the joint; sixth joint is narrow at the proximal end but widens distally and bears an oblique row of long plumose setae; the seventh joint strong, slightly curved, the fifth joint can be bent over to meet the distal tooth of the fourth joint.

Female.—Gnathopod, 2, is more normal in shape and scarcely subchelate; the fifth joint is broader than the sixth but not produced into a tooth distally at the lower margin. The sixth joint is oblong and is as long as the fifth joint. The third, fourth, fifth and sixth joints bear numerous long plumose setae on the lower margin.

The second gnathopod (pl. XIV, fig. 6) in both the sexes is somewhat similar to the gnathopod 1, of the female but more slender and has the third joint distally produced into a lobe. The length of this projection also varies according to the development. The fifth and sixth joints are similar to those of the gnathopod 1, of the female and are similarly armed with long plumose setae but are considerably more slender.

Size.—Length of the female from the front of the head to the end of the uropods is about 7 mm.

34. Cerapus abditus Templeton.

(Plate XIV, figs. 7—15.)

Cystophium calamicola, Giles, 1885, p. 54, pl. 1.
Cerapus flinderei, Stebbing, 1888, p. 1163, pl. 125:
Cerapus abditus, Stebbing, 1910, p. 616, pl. 55-A.
Cerapus calamicola, Walker, 1904, p. 293.
Cerapus abditus, Barnard, 1916, p. 271.
Cerapus a ditus, Barnard, 1937, p. 173.
Cerapus abditus. Pirlot, 1938, p. 349, figs. 157—158.

Locality.—About twenty specimens, both male and female, were obtained from three or four plankton collections made at Madras inshore waters during the years 1948–1950.

Distribution.—Bay of Bengal, Ceylon, Sacotra, Australia, South Africa, Mauritius and South Arabian Coast.

Description.—The head is produced anteriorly into a subacute rostrum between the base of the antenna. Antenna 1 (pl. XIV, fig. 7) flagellum sub-equal to peduncle; lower margin with a large number of long setae ; flageilum 4–7 jointed. Antenna 2 (pl. XIV, fig. 8) peduncle longer than the flagellum, penultimate and the antipenulimate joints of the peduncle are sub-equal ; flagellum 4–6 jointed.

Gnathopod 1 (pl. XIV, fig. 9) same in both the sexes, second joint long ; third joint shorter than the preceding one ; fifth joint with the lower part produced outwards and fringed with setae ; sixth longer than the fifth, tapering towards the distal end ; seventh joint well developed; inner margin serrated. Gnathopod 2 (pl. XIV, fig 10) in male, the second joint is narrow at the base but widens towards the distal end, the anterior edge is almost straight except near the base and is fringed with spinules, the posterior margin is strongly convex and bears two or three setae at the apex ; the third joint has its distal extremity produced, rounded and tipped with a few setae ; fifth joint large and broad, its anterior margin very convex especially towards the base, the posterior margin is indistinctly serrated and bears five groups of long setae in the serrations ; the posterio-distal corner is produced acutely and reaches about half way along the inner margin of the sixth joint, and between this corner and the inner articulation of the sixth joint is a short rounded lobe reaching only about half as far ; the sixth joint considerably shorter than the fifth joint ; 7th joint rather very long and the inner margin is smooth. In the female, the gnathopod 2, resembles very much the gnathopod 1.

Peraeopod I (pl. XIV, fig. 11) second joint long, 5th joint slightly bulged at the anterior side. Peraeopod 2, (pl. XIV, fig. 12) 2nd joint broad, third joint longer than the 4th. Peraeopod 3 (pl. XIV, fig. 13) fourth joint drawn out at the lower distal end and is tipped with a single spine. Peraeopods fourth and fifth are alike.

(2) Telson bilobed, cleft extending about half way towards the base, each lobe rounded and bears on the surface two rows of sharp upturned teeth.

(2) *Bionomics.*—This is a tube-dwelling amphipod. The animal rests in the tube with the head and first segment of the peraeon and usually the ends of the second

gnathopods projecting out at the end and the pleon is bent back upon the body. The tube is cylindrical, of the same diameter throughout except at each end where it is somewhat widened, the two ends are quite similar and appear to be equally and indifferently used by the animal. The tube is quite free and unattached and is carried about by the animal when it moves. The material of which it is made is fairly tough, the surface is smooth and the whole appears to be formed from the secretion produced by the glands in the first and second peraeopods, no sand grains being used.

35. Ericthonius brasiliensis (Dana).

(Plate XV, fig. 1—13.)

Pyctilus brasiliensis Dana, 1853, and 55, ip. 976, t. 67, f. 5a–h.
Ericthonius brasiliensis Stebbing, 1906, p. 671.
Ericthonius brasiliensis Shoemaker, 1942, p. 48.

Locality.—Fourteen specimens, both male and female, were obtained from a collection made at the Madras harbour on 1st December, 1948. These are found clinging to the green algae that are found on the floating buoys.

Distribution.—This is a cosmopolitan species inhabiting the warm and temperate seas of the globe. This is the first record of this species from the Indian waters.

Description.—Body moderately slender. Head, lateral lobes broad with a small apical point. Eyes rather large, rounded, prominent, bright red. Antenna 1 (pl. XV, fig. 1) sub-equal to antenna 2; flagellum shorter than the peduncle; flagellum 7—10 jointed. Antenna 2, (pl. XV, fig. 2) peduncle longer than the flagellum; the ultimate joint of the peduncle slightly longer than the antipenultimate joint; flagellum about 6—10 jointed.

Gnathopod 1 (pl. XV. fig. 7) 2nd joint narrow at the base, broad at the middle; 3rd and the 4th joints rather small; 5th joint broader towards the distal end and longer than the 6th; 6th joint broader towards the base but tapering towards the distal end; 7th joint curved and long. Gnathopod 2 (pl. XV, fig. 8) in male, 2nd joint widening from a narrow neck, 5th very large, the palmar part produced into 2 teeth, the inner the smaller; 6th joint much narrower but not much shorter than basal part of the 5th, hind margin slightly convave in the middle; finger very large, falciform. Gnathopod 2 (pl. XV. fig. 13) in female, 5th joint prodiced along the hind margin of the 6th joint in a narrow lobe distally armed with setae; 6th joint large, palm rather oblique, longer than hind margin.

Peraeopods 1 (pl. XV. fig. 9) and 2, 2nd joint broadly oval, finger smooth. Peraeopods 3—5 successively longer; 2nd joint successively narrower in proportion to length.

Uropods 1 (pl. XV, fig. 10) and 2 peduncle longer than rami; peduncle and rami provided with small spines except the apical ones. Uropod 3 (pl. XV, fig. 11) peduncle broad at base, longer than the ramus. Telson twice as broad as long.

Size.—Length of the male from front of the head to the end of the uropods is about 4—6 mm.

36. Corophium acherusicm Costa.

(Plate XV, figs. 14—20.)

Corophium acherusicm Crawford, 1937, p. 617, fig. 21, (literature).

Locality.—A few specimens, both male and female, were collected from Krusadai Island (Gulf of Manaar). These amphipods were found clinging to the floating seaweeds.

Distribution.—This species has been recorded previously from Southern England ; coasts of France and Holland; Mediterranean northern coast of Africa from the Suez Canal to Senegal ; Durban Bay ; Dar-es-Salaam ; and Lyttleton Harbour, New Zealand ; east coast of America from Baffin's Bay to Brazil and from the west coast of America from Alaska, Vancouver Island, and California and also from Oahu, Hawaiian Islands and from a ship's bottom at Hong Kong. This is the first record of this species from India.

Description.—Female : Rostrum is small but much larger than in the male. Lower margin of the first joint of antenna 1 (pl. XV, figs. 19 and 20) with four or five spines, and inner margin with five spines. Antenna 2 with lower margin of second joint bearing a lobe armed with three minute spinules; third joint bearing a pair of spines on lower margin ; fourth joint bearing on lower margin a single distal spine at the back of which are three equally spaced pairs of spines,making seven spines in all and fifth joint bearing two equally spaced spines on lower margin.

Peraeopod 5 without the swelling or row of short spinules on fifth joint. The first joint of mandibular palp scarcely at all produced distally where the characteristic plumose seta is borne. The first gnathopod with the third and fifth joints densely setose, the fifth tapering distally, the palm slightly oblique, convex and front margin of joint fringed with slender spines ; the seventh joint smooth and curved. The second gnathopod has the fourth joint fringed with the customary double row of extremely long setae and the seventh joint with two teeth on inner margin.

The peduncle of uropod 1 has a pointed triangular cone at its distal end and a row of about 7 to 8 spines on outer margin and one spine on the inner margin at the distal end. The outer ramus has five spines on outer edge besides the four terminal spines and without any spines on the inner margin. The inner ramus has six lateral spines and no spines on the inner margin. The peduncle of uropod 2 is smaller in size and has one spine at the distal end on the inner side. The rami are sub-equal in length. The outer ramus has two spines on the outer side while the inner has one spine on the outer side in addition to the three terminal spines. Both the rami are devoid of any spines on the inner margins. Uropod 3 peduncle is shorter than the ramus ; two slender spines arise from the distal end of the outer margin of the peduncle. The ramus is provided distally with four long and four or five short spines. The inner margins of ramus is provided with small setae. The telson is triangular.

Male.—The rostrum is very minute. Lower joint of first joint of antenna 1 (pl. XV, fig. 14) is provided distally with a single small spine. The inner margin of this joint is without spines. The fourth joint of antenna 2 (pl. XV, fig. 15) has the lower margin produced distally into a stout slightly curved tooth above which are two smaller teeth ; the lower inner side of this joint is without spines ; the fifth joint is armed below proximally with a low tooth which nearly opposes the large tooth of the fourth joint when the fifth joint is flexed. First joint of mandibular palp scarcely at all produced distally.

The peduncle of the uropod 1 (pl. XV, Fig. 18) is produced distally into a traingular lobe as in the female ; the outer margin bears five spines and inner margin with two or three spines. Outer ramus has three spines on outer margin and without any spines on the inner margin. The inner ramus has four spines on the outer margin and no spines on the inner margin. The peduncle of uropod 2 with one spine at the distal inner end. The outer ramus as well as the inner ramus have no spines on their margin excepting the four terminal spines. Uropod 3 is like that of the female.

Size —Length of the male from front of the head to the end of the uropods is about 3 to 4 mm.

37. Corophium madrasensis Nayar.

Corophium madrasensis Nayar, 1950, pp. 225–228, fig. 1 a–i.

Locality.—Large numbers of both males and females, belonging to this species were found living in the muddy bottom of the Adyar brackish water (under the San Thome Bridge).

Description—Male.—Head with front between the side lobes straight, slighlty convex, or with a very low central obtuse angular projection ; eyes dark, small, and slightly oval. Antenna 1 reaching beyond the proximal end of the fifth joint of antenna 2 ; inner margin of the first joint fringed with rather long setae but without spines ; the second joint a little shorter than the first and slightly more than twice as long as the third ; flagellum not quite so long as the peduncle and composed of about 12 joints. Antenna 2, fourth joint more than twice as long as the third with lower margin produced distally into a strong forward-curving tooth below and a small tooth above ; and a low narrow tooth or ridge at the lower inside surface at the proximal end ; fifth joint nearly as long as the fourth flagellum composed of one long and two short joints ; the lower margins of the third, fourth and fifth peduncular joints and the flagellum bear groups of long setae.

Gnathopod 1 with third and fifth joints densely setose, fifth tapering distally, palm slightly oblique, convex and front margin of joint fringed with slender spines ; seventh joint smooth and curved. Gnathopod 2 fourth joint fringed with customary double row of extremely long setae and seventh joint with three broad teeth.

The peduncle of uropod 1 has a pointed triangular cone at its distal end and a row of about four spines on outer margin and three spines on the inner margin. The outer ramus has three spines on outer edge besides the four or five terminal spines and without any spines on the inner margin. The inner ramus has three lateral spines on the outer margin in addition to three terminal spines and no spines on the inner margin. The peduncle of uropod 2 is smaller in size and has one thin spine at the distal end on the outer side. The rami are subequal in length and have no spines on their inner margins. The outer ramus has two lateral spines on its outer margin while the inner ramus bears only the terminal spines. Uropod 3 is very short. The ramus is shorter than the peduncle ; one or two small and slender spines arise from the distal end of the inner margin of the peduncle. The ramus is provided distally with eight or nine long slender spines. Telson triangular, with obtusely pointed apex. Female.—The female differs from the male principally in antenna 1 and antenna 2 and also in the number of spines in the uropods. Antenna 1 reaching to the distal end of the fifth joint of antenna 2 ; inner margin of first joint of peduncle bears three proximal spines and a few small setae ; lower margin bears two to five distal forwardly pointing spines ; flagellum slightly shorter than the peduncle and composed of about eight to nine joints. Antenna 2, much smaller and not so strong as in male ; third joint bears two small spines at the lower distal end; fourth joint has four spines along the lower edge and two spines on the inner surface. The fifth joint is setose but devoid of any spines on the inner margin but has a large number of long setae. Flagellum composed of one long and one or two short joints.

The peduncle of uropod 1 is produced distally into a triangular lobe as in the male ; the outer margin bears five or six spines and inner margin with four spines. The outer ramus has four spines on the outer margin and without any spines on the inner margin. The inner ramus has four spines on the outer margin and no spines on the inner margin. The peduncle of uropod 2 with two small spines at the distal end. The outer ramus has four spines on the outer margin and the inner ramus with one spine on the outer margin. Both rami without spines on their inner margins.

Size.—Length of the male from front of the head to the end of uropods about 4.5 mm.

Family PODOCERIDAE.

38. Podocerus brasiliensis (Dana).

(Plate XV, figs. 21—26).

Platophium brasiliensis Dana, 1853 and 55, p. 838, t. fig. 9 a-l.

Podocerus brasiliensis Barnard, 1935, p, 305 (literature).

Locality.—Both male and female specimens of this species were collected from the Madras harbour. They are usually found attached to the algae that are found growing on the floating buoys. Specimens were also collected from Adyar, Ennur and Krusadai Islands.

Distribution.—This species has been previously recorded from Tropical Atlantic (Rio De Janeiro, Antigua); Ceylon; Gulf of Manaar; Suez, Port Said, Dar-es-Salaam, Zanzibar, Natal, Rio De Janeiro and Antigua, W.I.

Description.—Body not carinate, elliptical. Antenna 1 (pl. XV, fig. 21), shorter than antenna 2; peduncle longer than the flagellum; flagellum as long as the second joint of the peduncle; third joint of the peduncle slightly shorter than the second joint of the peduncle; flagellum four jointed, accessory flagellum one jointed; peduncle as well as the flagellum fringed below with long setae. Antenna 2 ultimate joint of the peduncle very long; flagellum four jointed, the 1st one being very small. Antenna 2 is longer in male than in female.

Gnathopod 1, stronger in male than in female; fifth joint shorter than sixth in male, not in female, in each forming a broad lobe at middle of hind margin, sixth with very short hind margin; fourth, fifth and sixth joints armed with numerous spines on and about the hind margin; finger curved, serrate. Gnathopod 2, in male fourth joint scarcely at all produced at the distal hind corner, fifth small, scarcely distinct from sixth; sixth very long, oval, fringed with long plumose setae along the straight hinder edge; 7th joint more than half as long as the 6th joint. Gnathopod 2, in female, fourth joint considerably produced at the hind apex; fifth, small, triangular, but quite distinct; sixth broadly oval; armed with numerous setae-like spines but no plumose setae.

Peraeopods 1–5, sixth joint spinose on both margins; strong spines on the lower margin; 7th joint curved, strong. Peraeopods three to five, 2nd joint narrow and narrowing distally.

Uropod 1 and 2, peduncle and rami spinose; one of the rami decidedly shorter than the other; one spine in the apical group very long. Uropod 3, small hollow plate facing the telson's lateral margin. Telson entire with spines radiating round the projecting distal margin.

Size.—Length of the male from front of the head to the end of the uropods is about 5–6 mm.

Sub-order HYPERIIDEA.

Family HYPERIIDAE.

39. Hyperia bengalensis (Giles).

(Plate XVI, figs. 1—5.)

Lestrigonus bengalensis, Giles, 1887, p. 224, pl. 6 figs. 1–10.
Hyperia bengalensis Pirlot, 1939, bp. 35 (literature).
Hyperia bengalensis Shoemaker, 1942, p. 49.
Hyperia bengalensis Shoemaker, 1945 b, 238.

Locality.—This is a common species found in plankton and is found occurring throughout the year, in the Madras inshore waters.

Distribution.—This species was first described from the Bay of Bengal. It has since been recorded under different names from the North and South Atlantic ; Mediterranean ; Arabian Sea ; and South Pacific (off Cape Howe, Australia).

Description.—Male : Head broad. Eyes large. First three abdominal segments are of very large size ; the fourth is much shorter and narrowed in front ; 5th and 6th segments very small. Antenna 1, rather longer than the length of the body ; peduncle, first joint globular ; 2nd very small, third joint pear-shaped and provided with exceedingly fine hairs on its lower margin ; flagellum 20—30 jointed. Antenna 2, shorter than antenna 1 ; peduncle short, flagellum 20–25 jointed.

Gnathopod 1, short and stout ; (pl XVI, fig. 1) 5th joint anterior distal end produced and reaches nearly the middle of the next joint ; subchelate. Gnathopod 2 (pl. XVI, fig. 2) longer than the first , 5th joint lower distal end produced forwards and reaches about the end of the 6th joint ; subchelate. Peraeopods 1—5 (pl. XVI, figs. 3—5) almost of the same type increasing regularly in size. Uropods 1—3 almost of the same size and shape, first one being the longest. Telson triangular.

Female.—The female, in general form, closely resembles the young male. The main difference between the sexes lies in the antennae, which, in the female, are remarkably ill developed. The antenna 1, peduncle is three jointed and practically identical with that of the male, but the flagellum is reduced to a rudimentary first joint. The antenna 2, also reduced to a rudiment of the basal joint of the peduncle.

Size.—Length of the male from front of the head to the end of the uropods is about 2–3 mm.

Family LYCAEOPSIDAE.

40. **Brachyscelus crusculum** Bate.

Brachyscelus csusculum Bate 1861; p. 7, pl. 2, figs. 1–2.
Brachysculus crusculum Bate, 1862, p. 333, pl. 1, fig. 6.
Brachyscelus crusculum Shoemaker, 1945 b, p. 242.

Locality.—Two specimens were obtained from the plankton collection made on 12th December, 1949 at the Madras inshore area.

Distribution.—This species has been recorded from the North and South Atlantic ; North Pacific ; East Indies ; Indian Ocean and Mediterranean.

Description.—The cephalon laterally semi-hemispherical, rounded in front. The eyes are large and are inferiorly developed. Antenna 1 and antenna 2 are absent.

The gnathopod 2 resembles very much gnathopod 1, but rather longer and little larger Peraeopod 1 slender, slightly denticulated along the posterior margin of the 3rd, 4th and the 5th joints. Peraeopod 2 a little longer than peraeopod 1. Peraeopod 4, second joint broad, but scarcely longer than the third. Telson triangular.

Family OXYCEPHALIDAE.

41. Rhabdosoma armatum (M. Edw.).

(Plate XVI, figs. 6—11.)

Rhabdosoma armatum Bate, 1862, p. 344, fig. 6, pl. LIV.
Rhabdosoma armatum Spandl, 1927, p. 210.
Rhabdosoma armatum Barnard, 1930, p. 436.
Rhabdosoma armatum Barnard, 1932, p. 297.
Rhabdosoma armatum Pirlot, 1938, p. 374.

Locality.—Only three female specimens of this species were obtained from two plankton collections made during the month of December, 1950.

Distribution.—This species has been previously recorded from Tropical Atlantic, Indian and Pacific Oceans. This is the first record of this species from India.

Description.—Female : (pl. XVI, fig. 6) The rostrum is rather very long and is about five times as long as the rest of the cephalon. The lower distal corners of the second and third segments of the pleon segments are produced backwards into a point. The 1st and 2nd segments of the uropods are fused together . The last segment is more than half as long as the preceeding segment. Antenna 1 (pl. XVI, fig. 7) with the last segment flat and having a number of curved setae, which very much resemble sensory filaments. Antenna 2 is absent in female.

Gnathopod 1 (pl. XVI, fig. 8) 2nd joint rather stout, 3rd and 4th joints short ; 5th joint posterior distal end produced, inner margin serrated ; 6th joint smaller than 5th, posterior distal end produced and serrated ; 7th joint long and curved ; none of the joints bear setae or spines. Gnathopod 2 (pl. XVI, fig. 9) longer than gnathopod 1, 2nd joint about as long as the 5th ; the posterior distal end is produced well and extends slightly beyond the end of the 6th joint, inner margin serrated ; 6th joint serrated on the lower margin : claw curved.

Peraeopods 1 (pl. XVI, fig. 10) and 2 are almost of the same shape and size. Peraeopods 3 and 4 are very thin and slender. All the peraeopods are devoid of setae and spines.

Uropod 1, the longest, and extends about the middle of the telson. Uropod 2, smaller than uropod 3, and extends slightly beyond the base of the last segment of the uropod. The peduncle of all the uropods are serrated on both the margins. Uropods are all biramous, but rami rather very small. Telson long and cylindrical.

Size.—Length of the female from front of the head to the end of the uropods is about 25—35 mm.

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PLATES

PLATE I.

Shoemakerella nasuta (Dana).

Figs. 1—15. *Male*—

Fig. 1. *Antenna* 1.
„ 2. *Antenna* 2.
„ 3. *Mandible.*
„ 4. *Maxilla* 2.
„ 5. *Maxilliped.*
„ 6. *Gnathopod* 1.
„ 7. *Gnathopod* 2.
„ 8. *Peraeopod* 1.
„ 9. *Peraeopod* 3.
„ 10. *Peraeopod* 5.
„ 11. *Uropod* 1.
„ 12. *Uropod* 2.
„ 13. *Uropod* 3.
„ 14. *Telson.*

Female—

Fig. 15. *Antenna* 2.

Lepidepecreum foraminiferum Stebbing.

Figs. 16—26. *Female*—

Fig. 16. *Antenna* 1.
„ 17. *Antenna* 2.
„ 18. *Mandible.*
„ 19. *Gnathopod* 1.
„ 20. *Gnathopod* 2.
„ 21. *Peraeopod* 1.
„ 22. *Peraeopod* 5.
„ 23. *Uropod* 1.
„ 24. *Uropod* 2.
„ 25. *Uropod* 3.
„ 26. *Telson.*

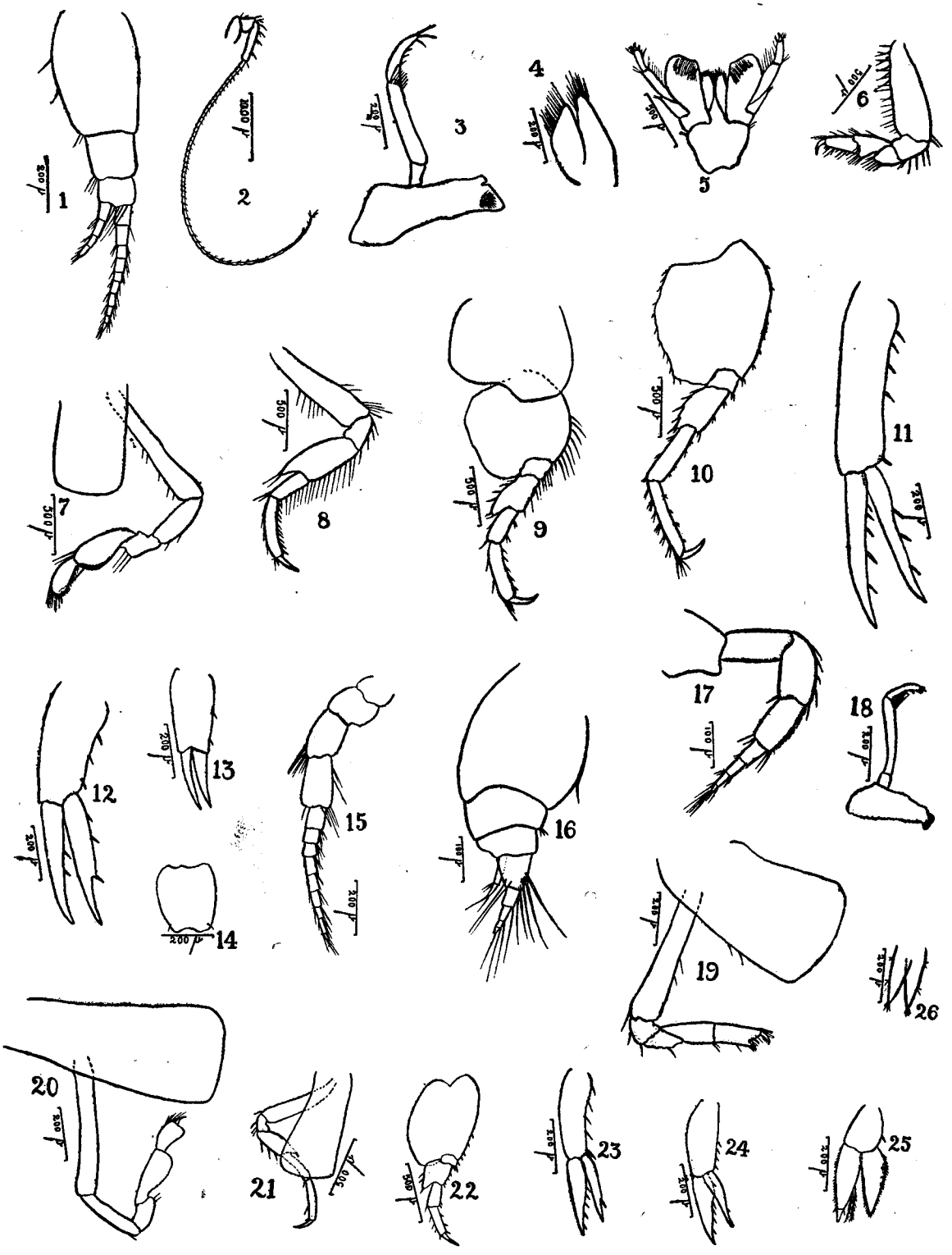
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PLATE II.

Ampelisca zamboange Stebbing.

Figs. 1—11. *Male*—

Fig. 1. *Antenna* 1.
„ 2. *Antenna* 2.
„ 3. *Mandible.*
„ 4. *Maxilliped.*
„ 5. *Gnathopod* 1.
„ 6. *Gnathopod* 2.
„ 7. *Peraeopod* 5.
„ 8. *Uropod* 1.
„ 9. *Uropod* 2.
„ 10. *Uropod* 3.
„ 11. *Telson.*

Ampelisca cyclops Walker.

Figs. 12—18. *Female*—

Fig. 12. *Gnathopod* 1.
„ 13. *Gnathopod* 2.
„ 14. *Peraeopod* 1.
„ 15. *Peraeopod* 5.
„ 16. *Uropod* 1.
„ 17. *Uropod* 2.
„ 18. *Uropod* 3.

Ampelisca tridens Walker.

Figs. 19—29. *Male*—

Fig. 19. *Antenna* 1.
„ 20. *Antenna* 2.
„ 21. *Maxilla* 1.
„ 22. *Maxilla* 2.
„ 23. *Gnathopod* 1.
„ 24. *Gnathopod* 2.
„ 25. *Peraeopod* 2.
„ 26. *Peraeopod* 5.
„ 27. *Uropod* 1.
„ 28. *Uropod* 2.
„ 29. *Uropod* 3.

Byblis lepta (Giles).

Figs. 30—34. *Female*—

Fig. 30. *Antenna* 1.
„ 31. *Gnathopod* 1.
„ 32. *Gnathopod* 2.
„ 33. *Peraeopod* 4.
„ 34. *Peraeopod* 5.

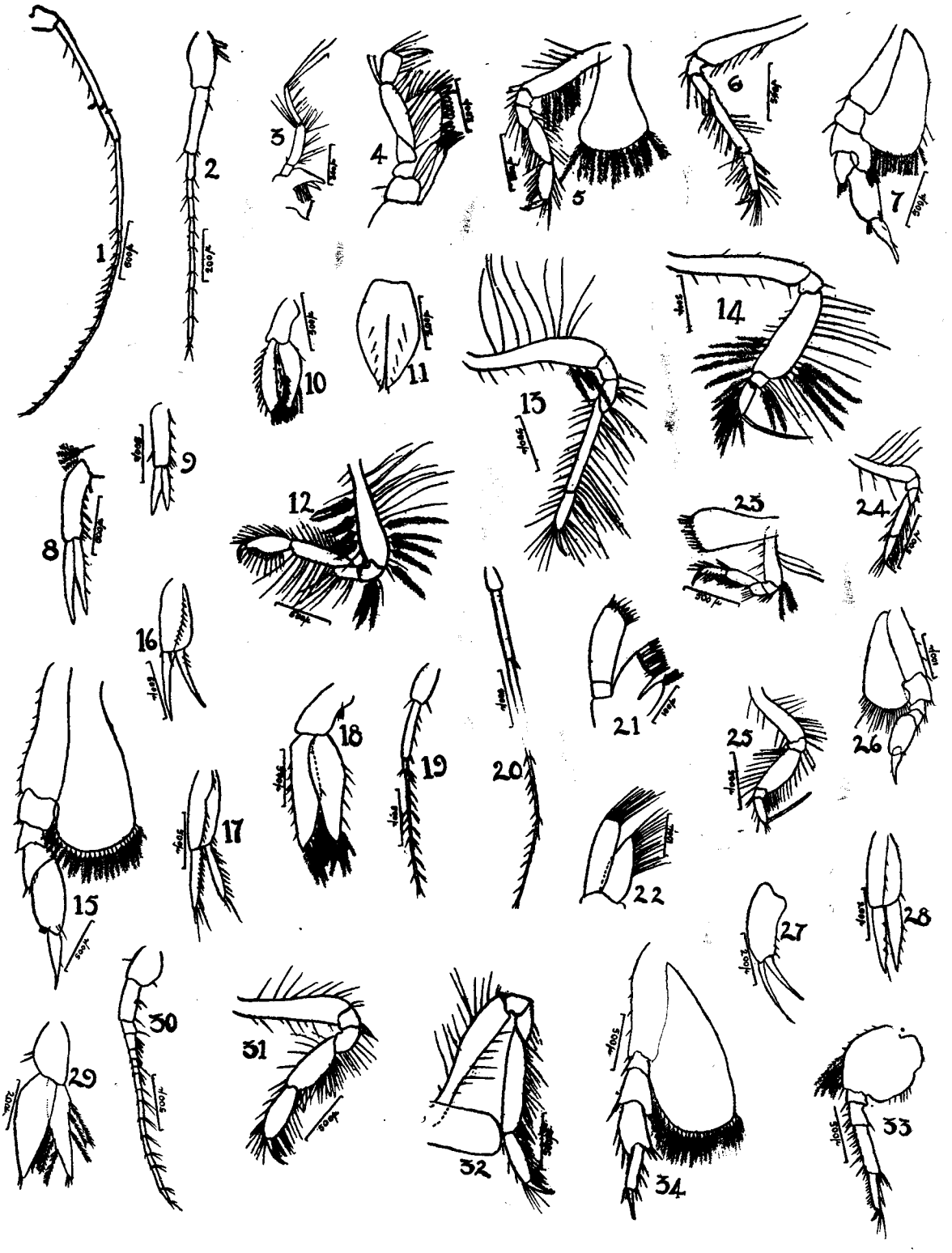
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PLATE III.

Platyischnopus herdmani Walker.

Figs. 1—15. *Female*—

Fig. 1. *Antenna* 1.
„ 2. *Antenna* 2.
„ 3. *Mandible.*
„ 4. *Maxilla* 1.
„ 5. *Maxilla* 2.
„ 6. *Maxilliped.*
„ 7. *Gnathopod* 1.
„ 8. *Gnathopod* 2.
„ 9. *Peraeopod* 1.
„ 10. *Peraeopod* 3.
„ 11. *Peraeopod* 4.
„ 12. *Peraeopod* 5.
„ 13. *Uropod* 1.
„ 14. *Uropod* 3.
„ 15. *Telson.*

Urothoë spinidigitus Walker.

Figs. 16—28. *Female*—

Fig. 16. *Antenna* 1.
„ 17. *Antenna* 2.
„ 18. *Mandible.*
„ 19. *Maxilla* 2.
„ 20. *Gnathopod* 1.
„ 21. *Gnathopod* 2.
„ 22. *Peraeopod* 2.
„ 23. *Peraeopod* 3.
„ 24. *Peraeopod* 4.
„ 25. *Peraeopod* 5.
„ 26. *Pleopod* 1.
„ 27. *Uropod* 2.
„ 28. *Telson.*

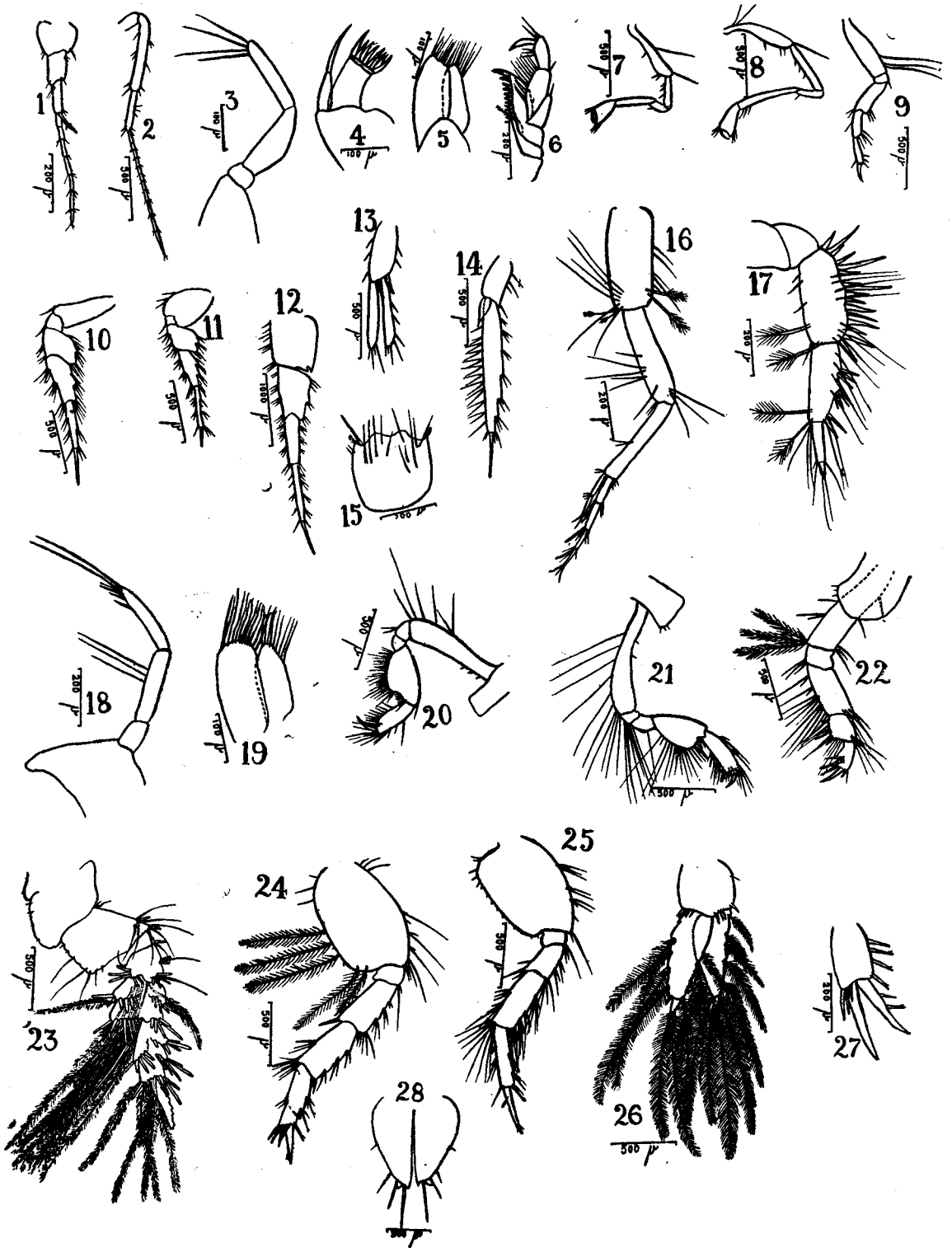
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PLATE IV.

Leptophoxus uncirostratus (Giles).

Figs. 1—16. *Female*—

Fig. 1. *Antenna* 1.
„ 2. *Antenna* 2.
„ 3. *Maxilla* 1.
„ 4. *Maxilla* 2.
„ 5. *Maxilliped.*
„ 6. *Gnathopod* 1.
„ 7. *Gnathopod* 2.
„ 8. *Peraeopod* 1.
„ 9. *Peraeopod* 2.
„ 10. *Peraeopod* 3.
„ 11. *Peraeopod* 4.
„ 12. *Peraeopod* 5.
„ 13. *Uropod* 1.
„ 14. *Uropod* 2.
„ 15. *Uropod* 3.
„ 16. *Telson.*

Cyproidea ornata Haswell.

Figs. 17—30. *Male*—

Fig. 17. *Antenna* 1.
„ 18. *Antenna* 2.
„ 19. *Mandible.*
„ 20. *Maxilla* 1.
„ 21. *Maxilla* 2.
„ 22. *Maxilliped.*
„ 23. *Gnathopod* 1.
„ 24. *Gnathopod* 2.
„ 25. *Peraeopod* 1.
„ 26. *Peraeopod* 4.
„ 27. *Uropod* 1.
„ 28. *Uropod* 2.
„ 29. *Uropod* 3.
„ 30. *Telson.*

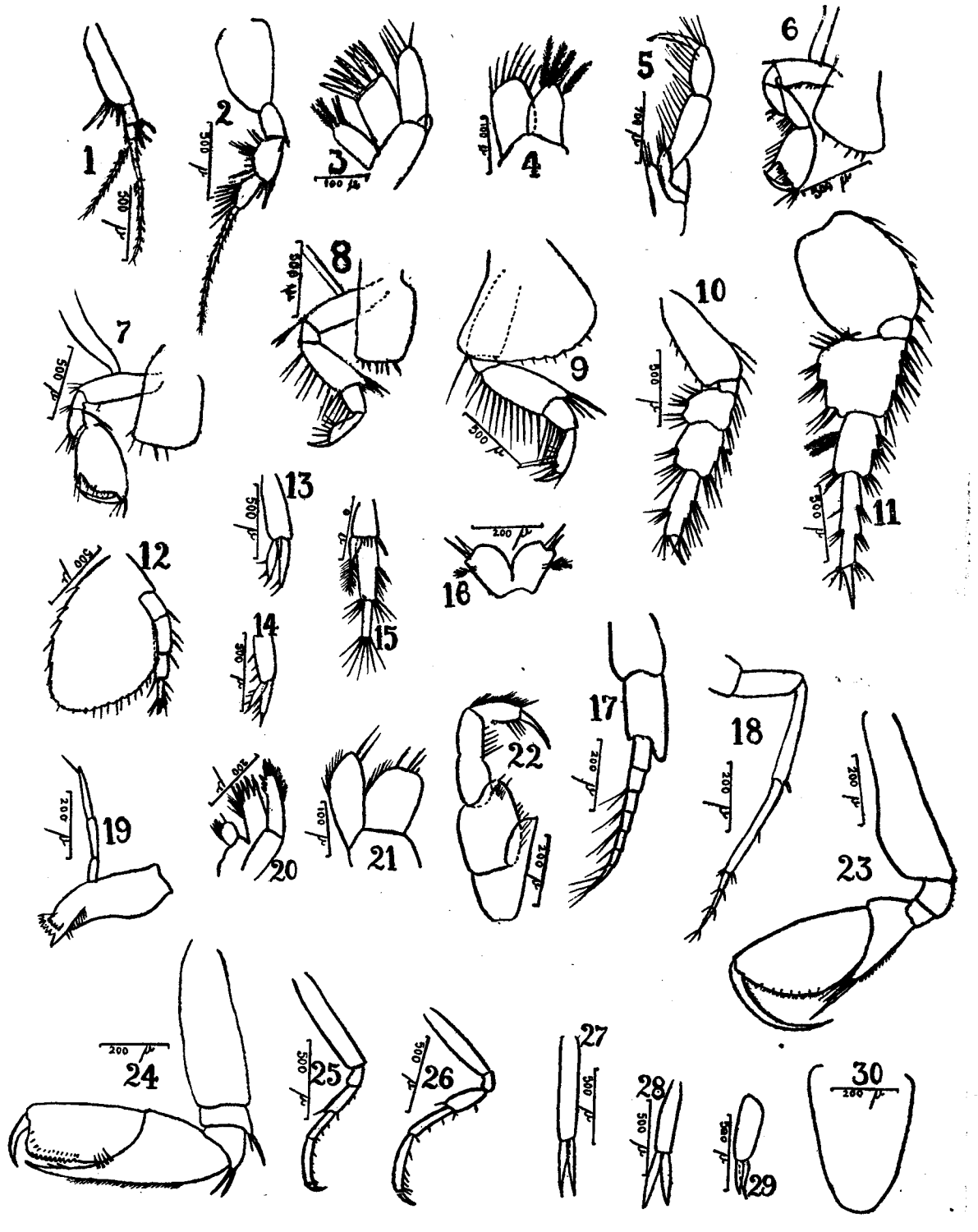
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PLATE V.

Leucothoe spinicarpa Abildgaard.

Figs. 1—6. *Male*—

Fig. 1. *Antenna* 1.
„ 2. *Antenna* 2.
„ 3. *Gnathopod* 1.
„ 4. *Gnathopod* 2.
„ 5. *Peraeopod* 1.
„ 6. *Peraeopod* 3.

Stenothoe gallensis Walker.

Figs. 7—19. *Male*—

Fig. 7. *Mandible.*
„ 8. *Maxilla* 1.
„ 9. *Gnathopod* 1.
„ 10. *Gnathopod* 2.
„ 11. *Peraeopod* 1.
„ 12. *Peraeopod* 3.
„ 13. *Peraeopod* 4.
„ 14. *Peraeopod* 5.
„ 15. *Uropod* 1.
„ 16. *Uropod* 3.
„ 17. *Telson.*

Female—

Fig. 18. *Gnathopod* 1.
„ 19. *Gnathopod* 2.

Perioculodes longimanus Bate and **Westwood.**

Figs. 20—33. *Female*—

Fig. 20. *Antenna* 1.
„ 21. *Antenna* 2.
„ 22. *Mandible.*
„ 23. *Gnathopod* 1.
„ 24. *Gnathopod* 2.
„ 25. *Peraeopod* 1.
„ 26. *Peraeopod* 2.
„ 27. *Peraeopod* 3.
„ 28. *Peraeopod* 4.
„ 29. *Peraeopod* 5.
„ 30. *Uropod* 1.
„ 31. *Uropod* 2.
„ 32. *Uropod* 3.
„ 33. *Telson.*

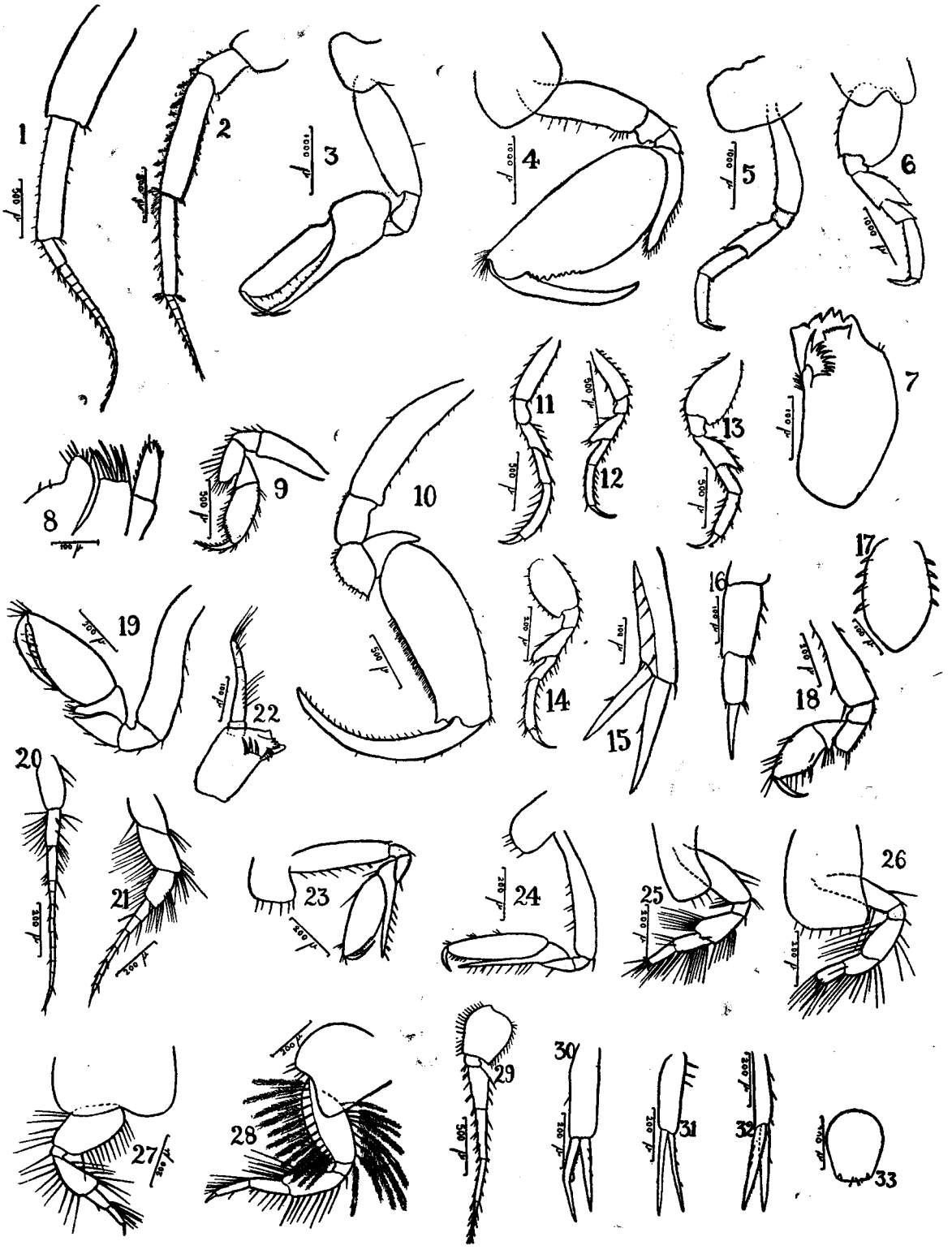
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PLATE VI.

Paracalliope indica Barnard.

Figs. 1—7. *Male*—

Fig. 1. *Maxilla.* 1.
„ 2. *Gnathopod* 1.
„ 3. *Gnathopod* 2.
„ 4. *Peraeopod* 5.
„ 5. *Uropod* 3.

Female—

Fig. 6. *Gnathopod* 1.
„ 7. *Gnathopod* 2.

Eriopisa chilkensis Chilton.

Figs. 8—17. *Female*—

Fig. 8. *Antenna* 2.
„ 9. *Mandible.*
„ 10. *Gnathopod* 1.
„ 11. *Gnathopod* 2.
„ 12. *Peraeopod* 3.
„ 13. *Peraeopod* 5.
„ 14. *Uropod* 1.
„ 15. *Uropod* 2.
„ 16. *Uropod* 3.
„ 17. *Telson.*

Magaluropus agilis Hoeck.

Figs. 18—29. *Male*—

Fig. 18. *Antenna* 1.
„ 19. *Antenna* 2.
„ 20. *Mandible.*
„ 21. *Maxilla* 1.
„ 22. *Maxilliped.*
„ 23. *Gnathopod* 1.
„ 24. *Gnathopod* 2.
„ 25. *Peraeopod* 1.
„ 26. *Peraeopod* 3.
„ 27. *Peraeopod* 5.
„ 28. *Uropod* 1.
„ 29. *Uropod* 3.

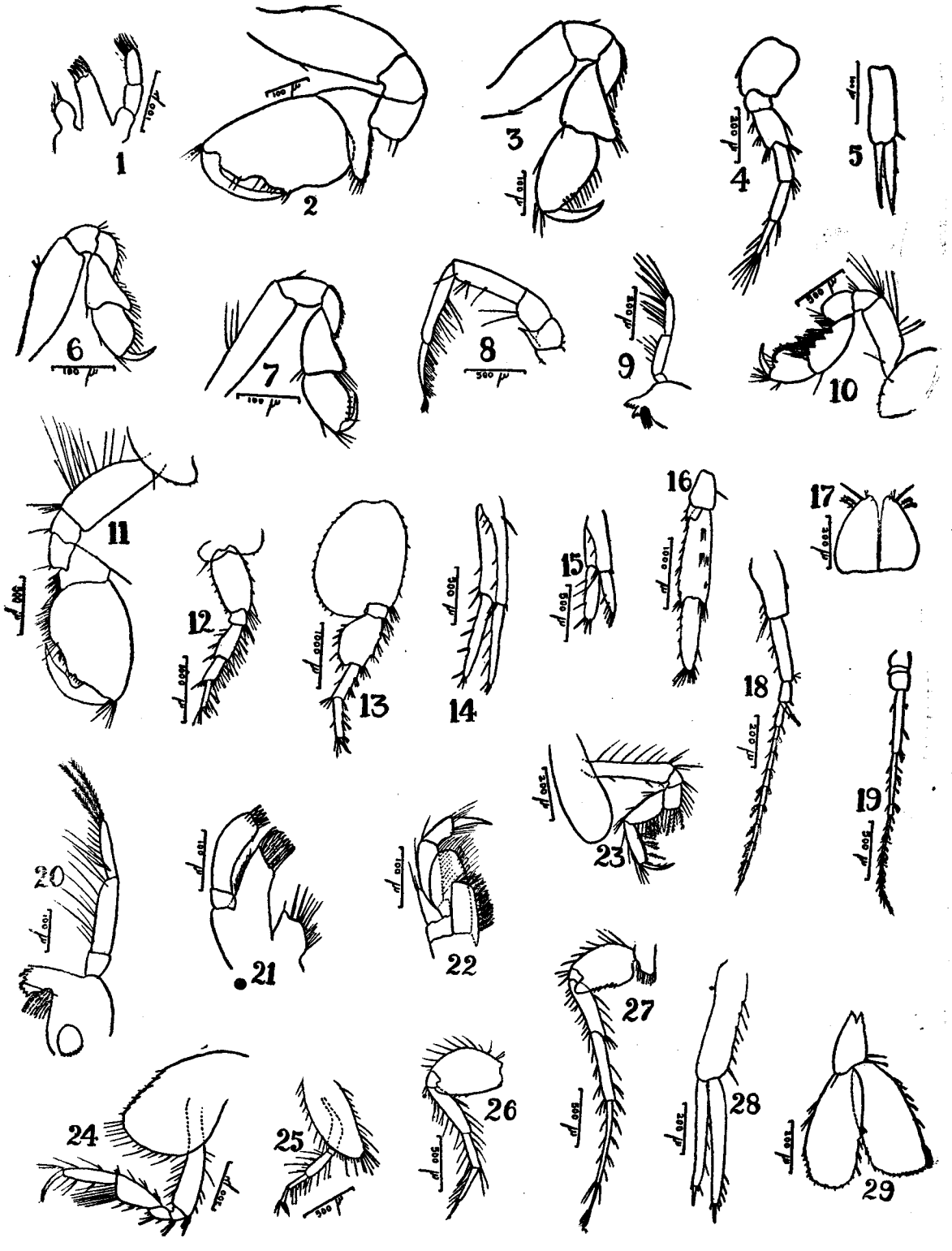
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PLATE VII.

Melita fresnalii (Aud).

Figs. 1—5. *Male*—

Fig. 1. *Gnathopod* 1.
„ 2. *Gnathopod* 2.
„ 3. *Peraeopod* 1.
„ 4. *Peraeopod* 4.
„ 5. *Peraeopod* 5.

Maera quadrimana (Dana).

Figs. 6—15. *Male*—

Fig. 6. *Antenna* 1.
„ 7. *Antenna* 2.
„ 8. *Mandible.*
„ 9. *Maxilla* 1.
„ 10. *Maxilla* 2.
„ 11. *Gnathopod* 1.
„ 12. *Gnathopod* 2.
„ 13. *Peraeopod* 1.
„ 14. *Peraeopod* 3.
„ 15. *Peraeopod* 5.

Maera pacifica (Schellenberg).

Figs. 16 and 17. *Male*—

Fig. 16. *Antenna* 1.
„ 17. *Gnathopod* 2.


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PLATE VIII.

M ˙ra othonides Walker.

Figs. 1—18. *Male*—

Fig. 1. *Antenna* 1.
„ 2. *Antenna* 2.
„ 3. *Mandible.*
„ 4. *Maxilla* 1.
„ 5. *Maxilla* 2.
„ 6. *Maxilliped.*
„ 7. *Gnathopod* 1.
„ 8. *Gnathopod* 2.
„ 9. *Gnathopod* 2.
„ 10. *Peraeopod* 5.
„ 11. *Peraeopod* 4.
„ 12. *Peraeopod* 3.
„ 13. *Peraeopod* 2.
„ 14. *Peraeopod* 1.
„ 15. *Uropod* 1.
„ 16. *Uropod* 2.
„ 17. *Uropod* 3.
„ 18. *Telson.*

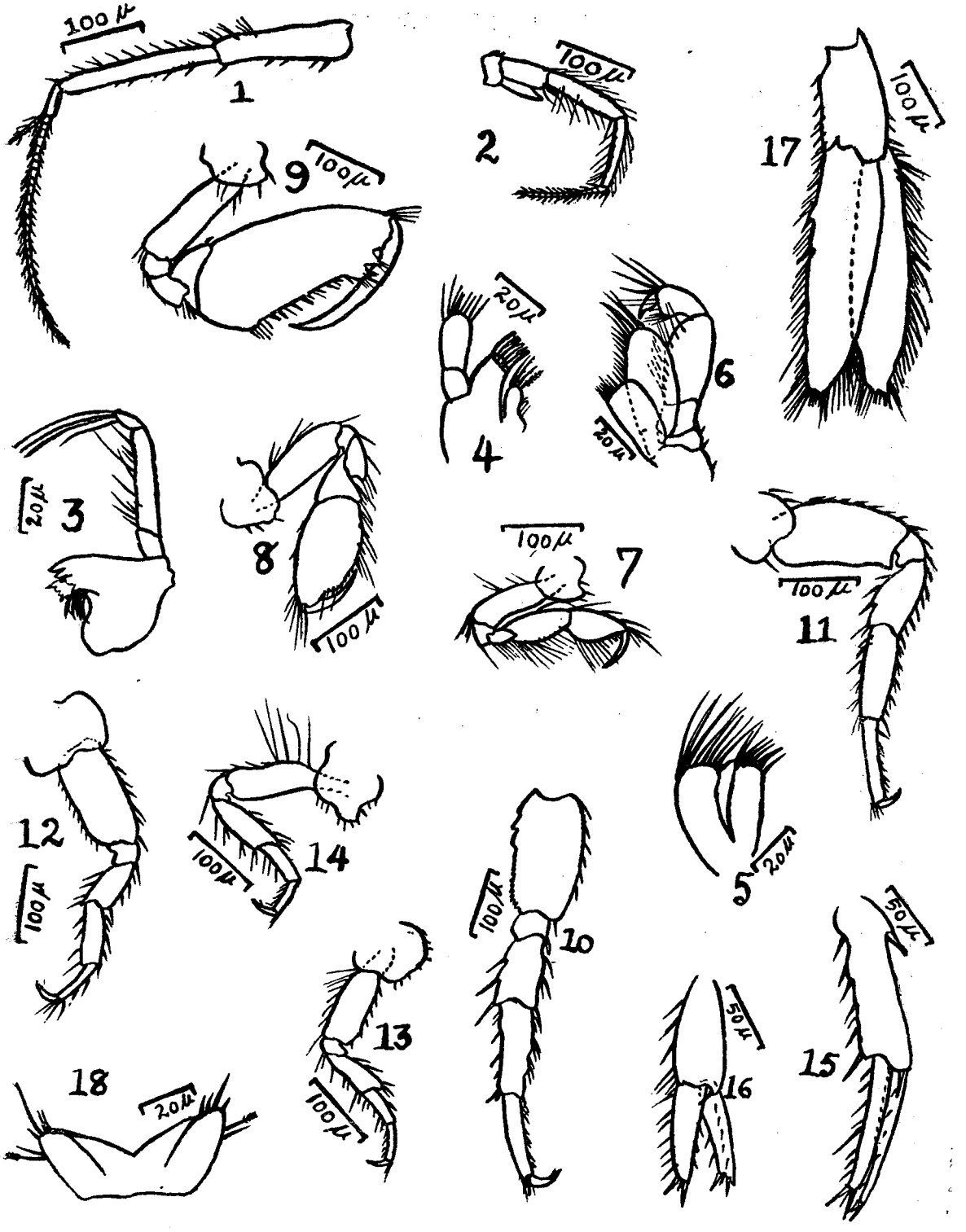
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PLATE IX.

Quadriviso bengalensis Stebbing.

Figs. 1—19. *Male*—

Fig. 1. *Antenna* 1.
„ 2. *Antenna* 2.
„ 3. *Mandible.*
„ 4. *Maxilla* 1.
„ 5. *Maxilla* 2.
„ 6. *Maxilliped.*
„ 7. *Gnathopod* 2.
„ 8. *Gnathopod* 1.
„ 9. *Peraeopod* 1.
„ 10. *Peraeopod* 2.
„ 11. *Peraeopod* 3.
„ 12. *Peraeopod* 4.
„ 13. *Peraeopod* 5.
„ 14. *Uropod* 2.
„ 15. *Uropod* 2.
„ 16. *Uropod* 3.
„ 17. *Telson.*

Female—

Fig. 18. *Gnathopod* 2.
„ 19. *Gnathopod* 1.

Elamopus pectenicrus (Bate).

Figs. 20—35. *Female*—

Fig. 20. *Antenna* 1.
„ 21. *Antenna* 2.
„ 22. *Mandible.*
„ 23. *Maxilla* 1.
„ 24. *Maxilla* 2.
„ 25. *Maxilliped.*
„ 26. *Gnathopod* 1.
„ 27. *Gnathopod* 2.
„ 28. *Peraeopod* 1.
„ 29. *Peraeopod* 2.
„ 30. *Peraeopod* 3.
„ 31. *Peraeopod* 5.
„ 32. *Uropod* 1.
„ 33. *Uropod* 2.
„ 34. *Uropod* 3.
„ 35. *Telson.*

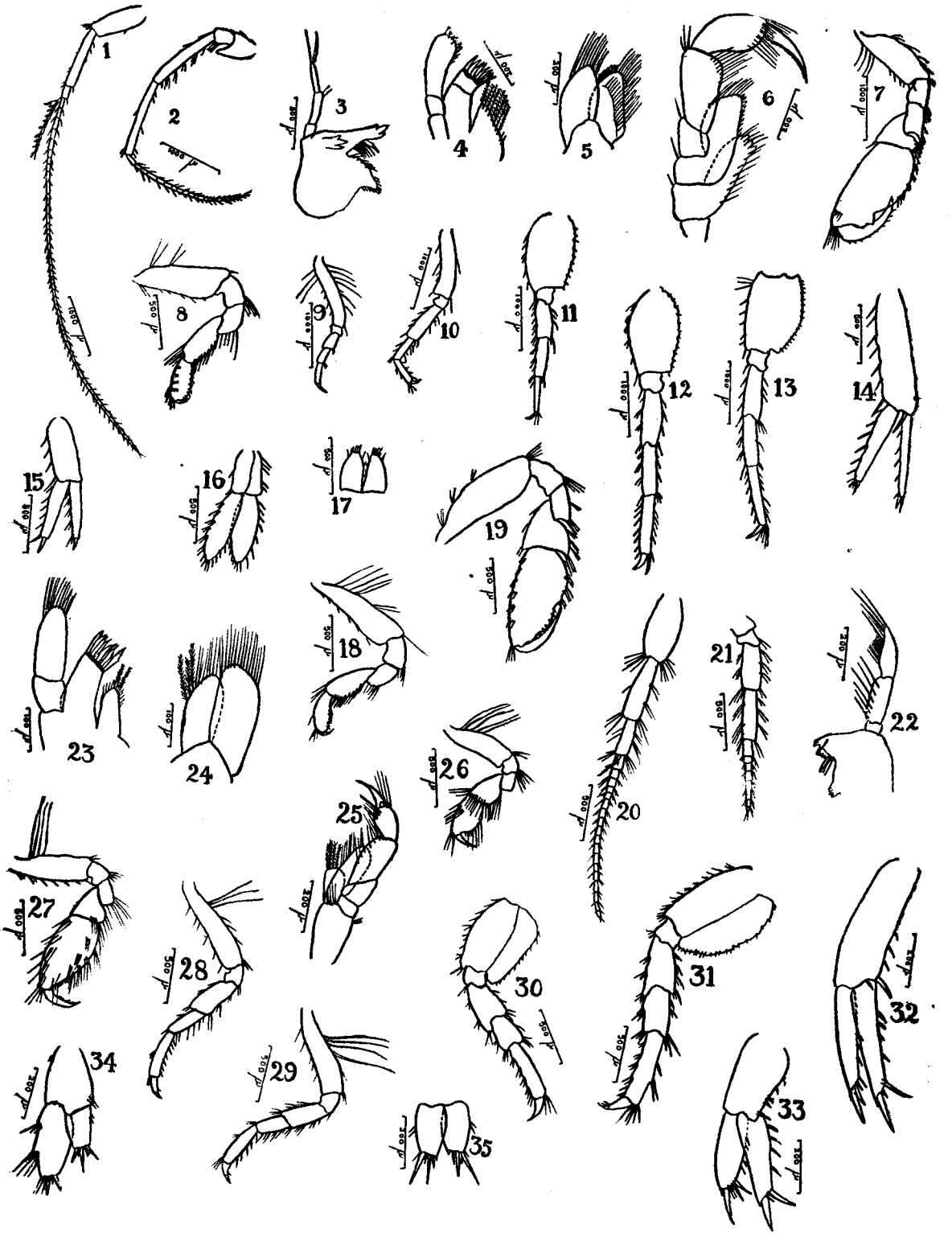
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PLATE X.

Talorchestia martensii (Weber).

Figs. 1—9. *Male*—

Fig. 1. *Maxilliped.*
„ 2. *Gnathopod* 1.
„ 3. *Gnathopod* 2.
„ 4. *Peraeopod* 2.
„ 5. *Peraeopod* 3.
„ 6. *Uropod* 2.
„ 7. *Uropod* 3.

Female—

Fig. 8. *Gnathopod* 1.
„ 9. *Gnathopod* 2.

Hyale hawaiensis (Dana).

Figs. 10—24. *Male*—

Fig. 10. *Maxilla* 1.
„ 11. *Maxilla* 2.
„ 12. *Maxilliped.*
„ 13. *Gnathopod* 1.
„ 14. *Gnathopod* 2.
„ 15. *Peraeopod* 1.
„ 16. *Peraeopod* 3.
„ 17. *Uropod* 1.
„ 18. *Uropod* 2.
„ 19. *Uropod* 3.
„ 20. *Telson.*

Female—

Fig. 21. *Antenna* 1.
„ 22. *Antenna* 2.
„ 23. *Gnathopod* 1.
„ 24. *Gnathopod* 2.

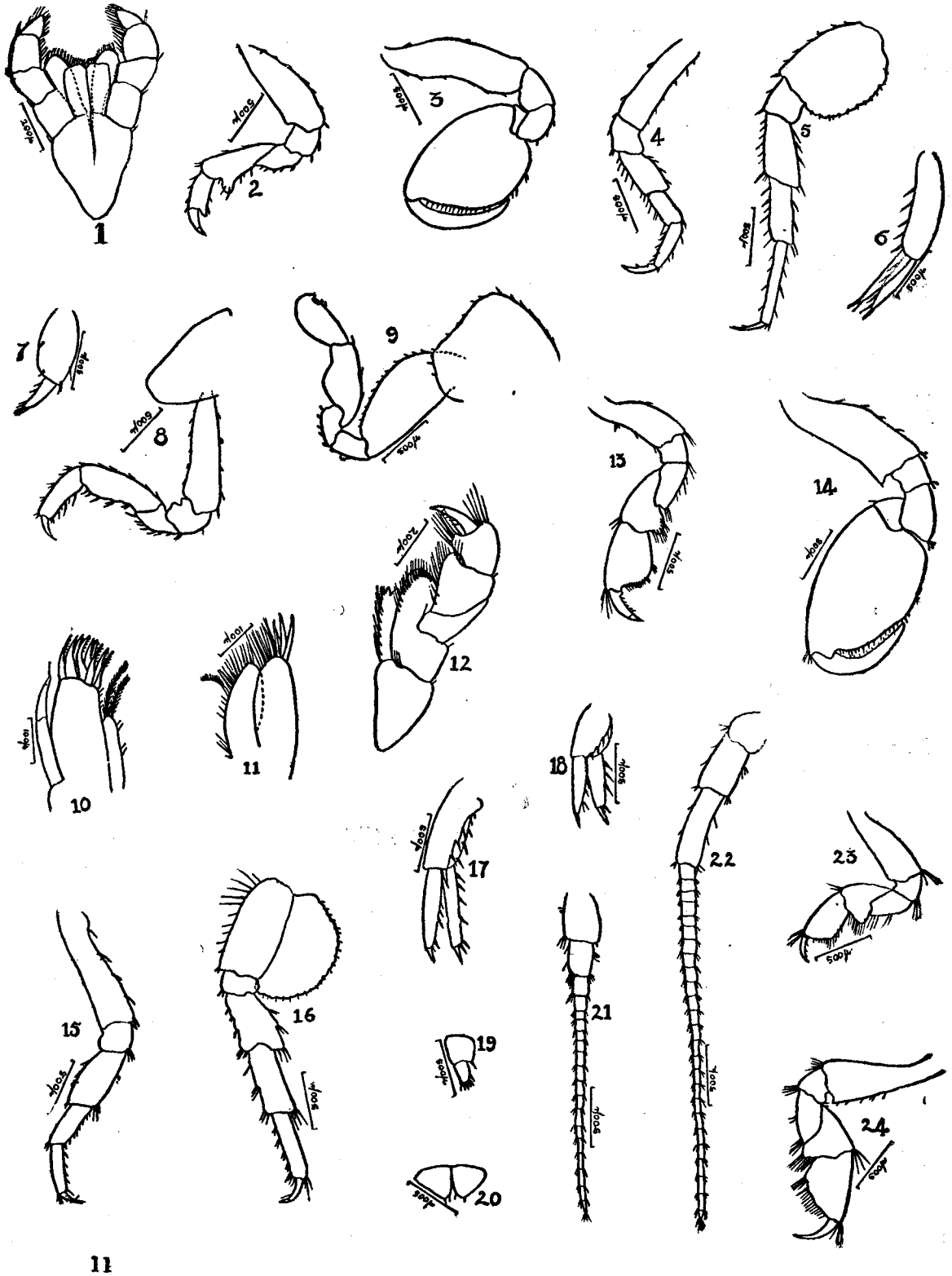
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PLATE XI.

Hyale honoluluensis (Schellenberg).

Figs. 1—9. *Male*—

Fig. 1. *Gnathopod* 1.
„ 2. *Gnathopod* 2.
„ 3. *Peraeopod* 1.
„ 4. *Peraeopod* 5.
„ 5. *Uropod* 1.
„ 6. *Uropod* 3.
„ 7. *Telson.*

Female—

Fig. 8. *Gnathopod* 1.
„ 9. *Gnathopod* 2.

Microprotopus maculatus (Norman).

Figs. 10—22. *Male*—

Fig. 10. *Antenna* 1.
„ 11. *Antenna* 2.
„ 12. *Mandible.*
„ 13. *Maxilla* 1.
„ 14. *Maxilla* 2.
„ 15. *Gnathopod* 1.
„ 16 *Gnathopod* 2.
„ 17. *Peraeopod* 1.
„ 18. *Peraeopod* 3.
„ 19. *Uropod* 1.
„ 20. *Uropod* 3.

Female—

Fig. 21. *Gnathopod* 1.
„ 22. *Gnathopod* 2.

Cheirophotis megacheles (Giles).

Figs. 23—25. *Male*—

Fig. 23. *Antenna* 1.
„ 24. *Gnathopod* 1.
„ 25. *Gnathopod* 2.

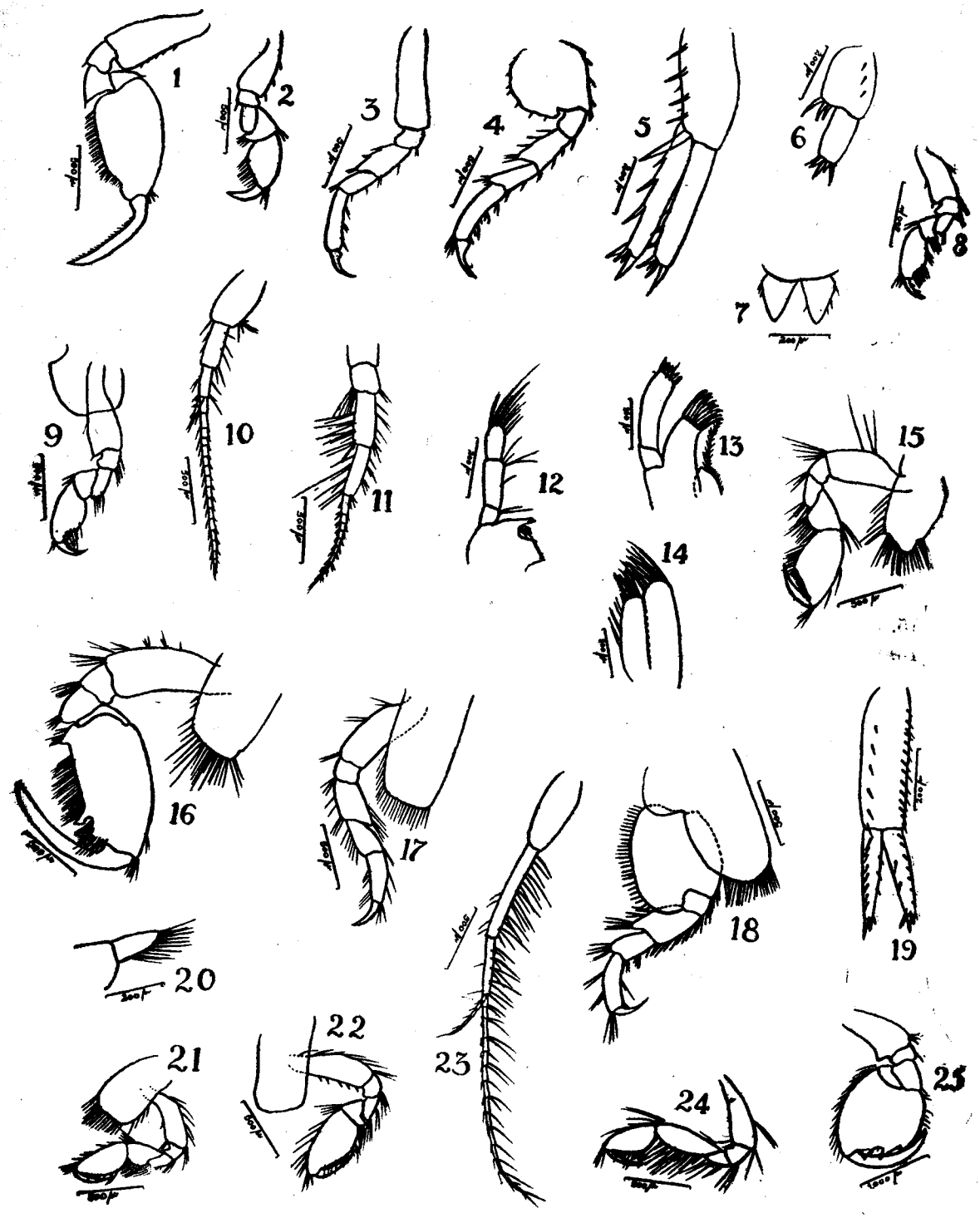
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PLATE XII.

Photis longicaudata (Bate & Westwood).

Figs. 1—7. ***Female***—

Fig 1. *Antenna* 1.
„ 2. *Antenna* 2.
„ 3. *Gnathopod* 1.
„ 4. *Gnathopod* 2.
„ 5. *Peraeopod* 1.
„ 6. *Peraeopod* 5.
„ 7. *Uropod* 3.

Photis digitata Barnard.

Figs. 8—24. ***Male***—

Fig. 8. *Antenna* 1.
„ 9. *Antenna* 2.
„ 10. *Mandible.*
„ 11. *Maxilla* 1.
„ 12. *Maxilla* 2.
„ 13. *Maxilliped.*
„ 14. *Gnathopod* 1.
„ 15. *Gnathopod* 2.
„ 16. *Peraeopod* 1.
„ 17. *Peraeopod* 2.
„ 18. *Peraeopod* 3.
„ 19. *Peraeopod* 5.
„ 20. *Uropod* 1.
„ 21. *Uropod* 3.
„ 22. *Telson.*

Female—

Fig. 23. *Gnathopod* 1.
„ 24. *Gnathopod* 2.

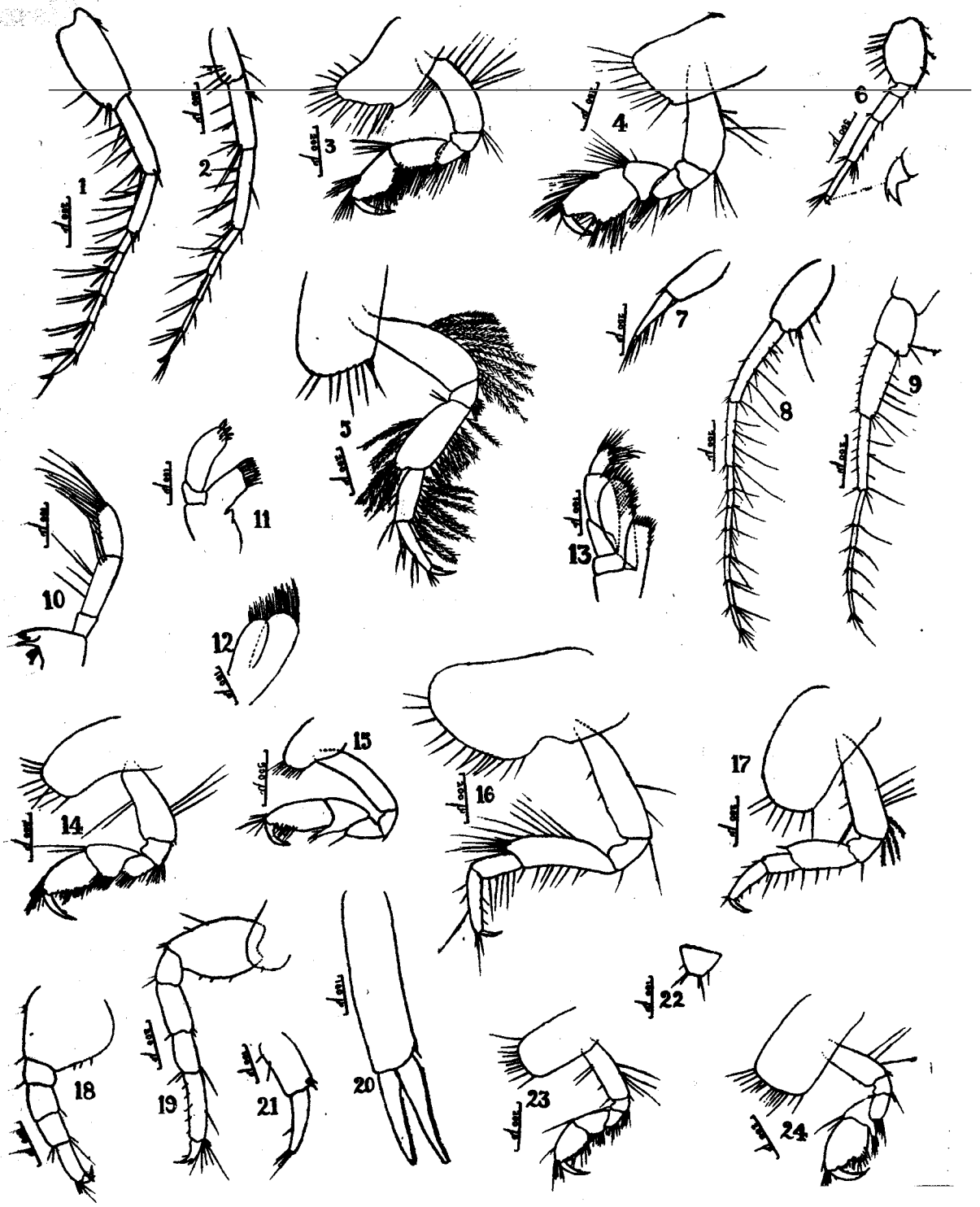
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PLATE XIII.

Ampithoe inda M. Edw.

Figs. 1—11. *Male*—

Fig. 1. *Antenna* 1.
„ 2. *Antenna* 2.
„ 3. *Mandible.*
„ 4. *Maxilla* 1.
„ 5. *Maxilla* 2.
„ 6. *Gnathopod* 1.
„ 7. *Gnathopod* 2.
„ 8. *Peraeopod* 1.
„ 9. *Peraeopod* 3.
„ 10. *Uropod* 1.
„ 11. *Uropod* 3.

Grubia filosa (Savigny).

Figs. 12—19. *Male.*—

Fig. 12. *Peraeopod* 1.
„ 13. *Peraeopod* 3.
„ 14. *Peraeopod* 5.
„ 15. *Uropod* 1.
„ 16. *Uropod* 3.
„ 17. *Telson.*

Female.—

Fig. 18. *Gnathopod* 1.
„ 19. *Gnathopod* 2.

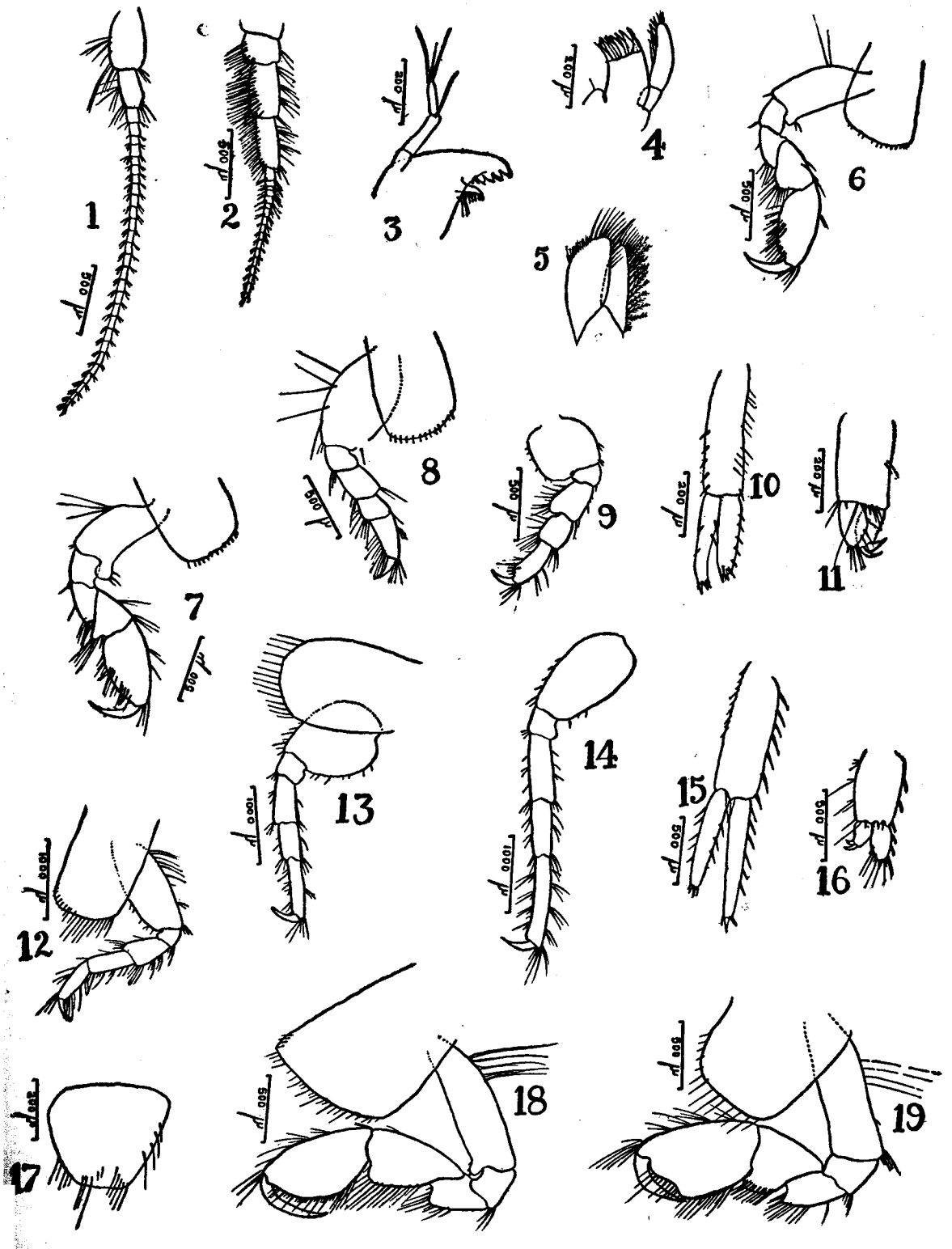
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PLATE XIV.

Grandidierella bonnieri Stebbing.

Figs. 1—5. *Male*—

Fig. 1. *Mandible.*
„ 2. *Gnathopod* 1.
„ 3. *Peraeopod* 1.
„ 4. *Peraeopod* 5.
„ 5. *Uropod* 3.

Grandidierella gilesi Chilton.

Fig. 6. *Male*—

Fig. 6. *Gnathopod* 2.

Cerapus abditus Templeton.

Figs. 7—15. *Male*—

Fig. 7. *Antenna* 1.
„ 8. *Antenna* 2.
„ 9. *Gnathopod* 1.
„ 10. *Gnathopod* 2.
„ 11. *Peraeopod* 1.
„ 12. *Peraeopod* 2.
„ 13. *Peraeopod* 3.
„ 14. *Peraeopod* 5.
„ 15. *Uropod* 1.

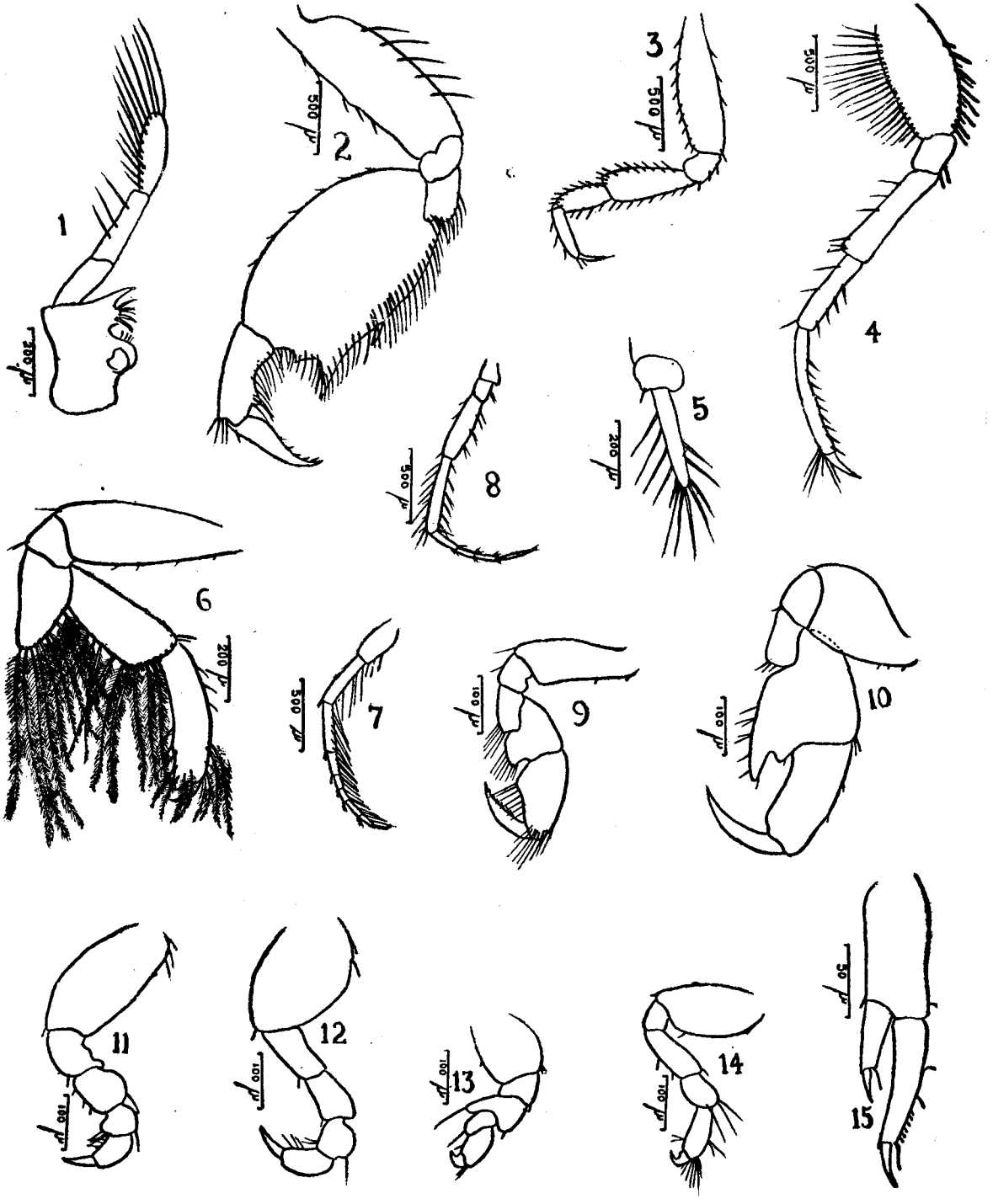
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PLATE XV.

Erichthonius brasiliensis (Dana).

Figs. 1—13. *Male*—

Fig. 1. *Antenna* 1.
„ 2. *Antenna* 2.
„ 3. *Mandible.*
„ 4. *Maxilla* 1.
„ 5. *Maxilla* 2.
„ 6. *Maxilliped.*
„ 7. *Gnathopod* 1.
„ 8. *Gnathopod* 2.
„ 9. *Peraeopod* 1.
„ 10. *Uropod* 1.
„ 11. *Uropod* 3.

Female—

Fig. 12. *Gnathopod* 1.
„ 13. *Gnathopod* 2.

Corophium acherusicm Costa.

Figs. 14—20. *Male*—

Fig. 14. *Antenna* 1 (side view).
„ 15. *Antenna* 2 (inside view).
„ 16. *End of Gnathopod* 1.
„ 17. *End of Gnathopod* 2.
„ 18. *Urosome and Uropods.*

Female—

Fig. 19. *Antenna* 1 (from above).
„ 20. *Antenna* 1 (from side).

Podocerus brasiliensis (Dana).

Figs. 21—26. *Male*—

Fig. 21. *Antenna* 1.
„ 22. *Mandible.*
„ 23. *Maxilla.* 1.
„ 24. *Maxilla* 2.
„ 25. *Gnathopod* 1.
„ 26. *Gnathopod* 2.

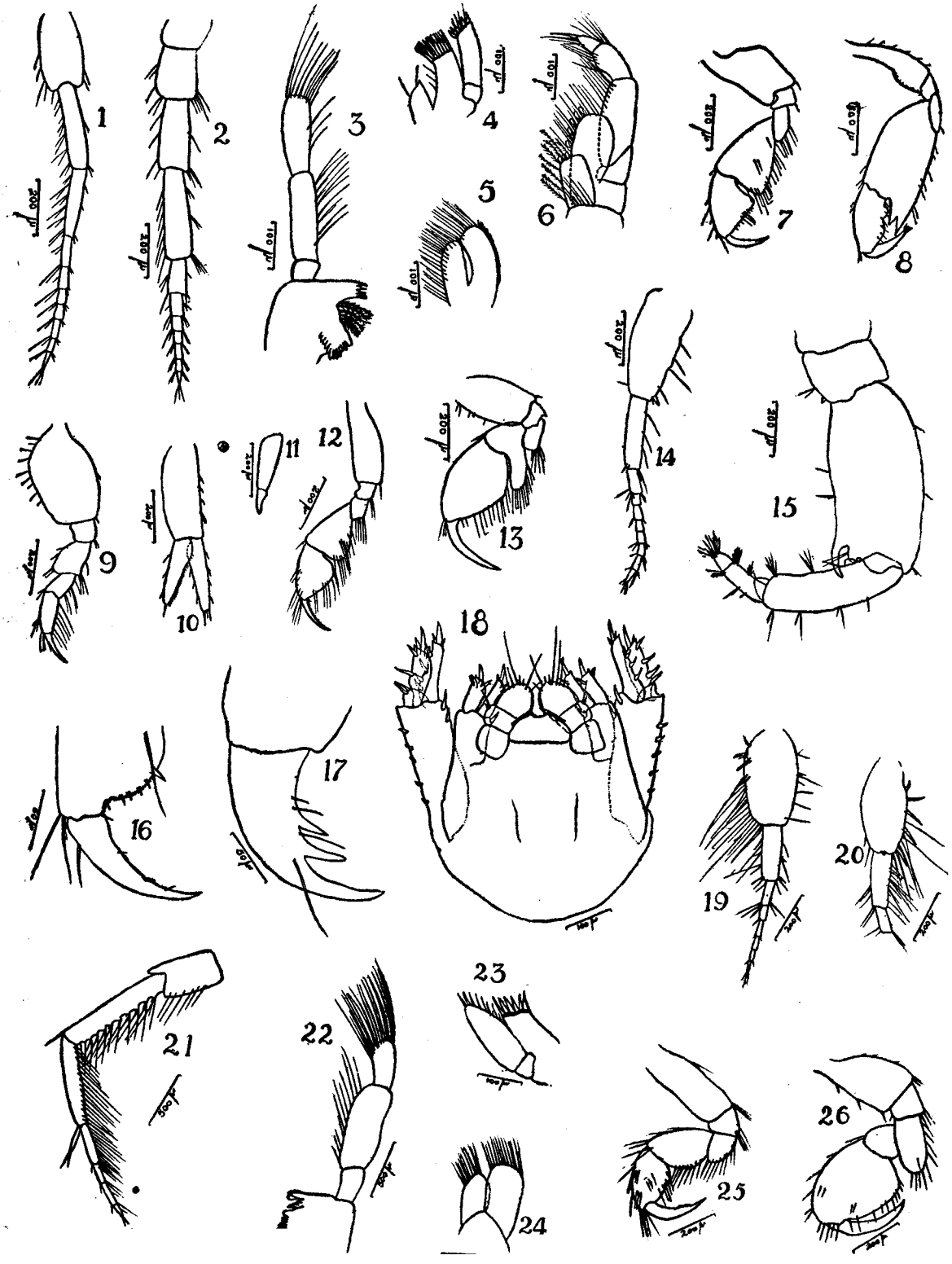
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PLATE XVI.

Hyperia bengalensis (Giles).

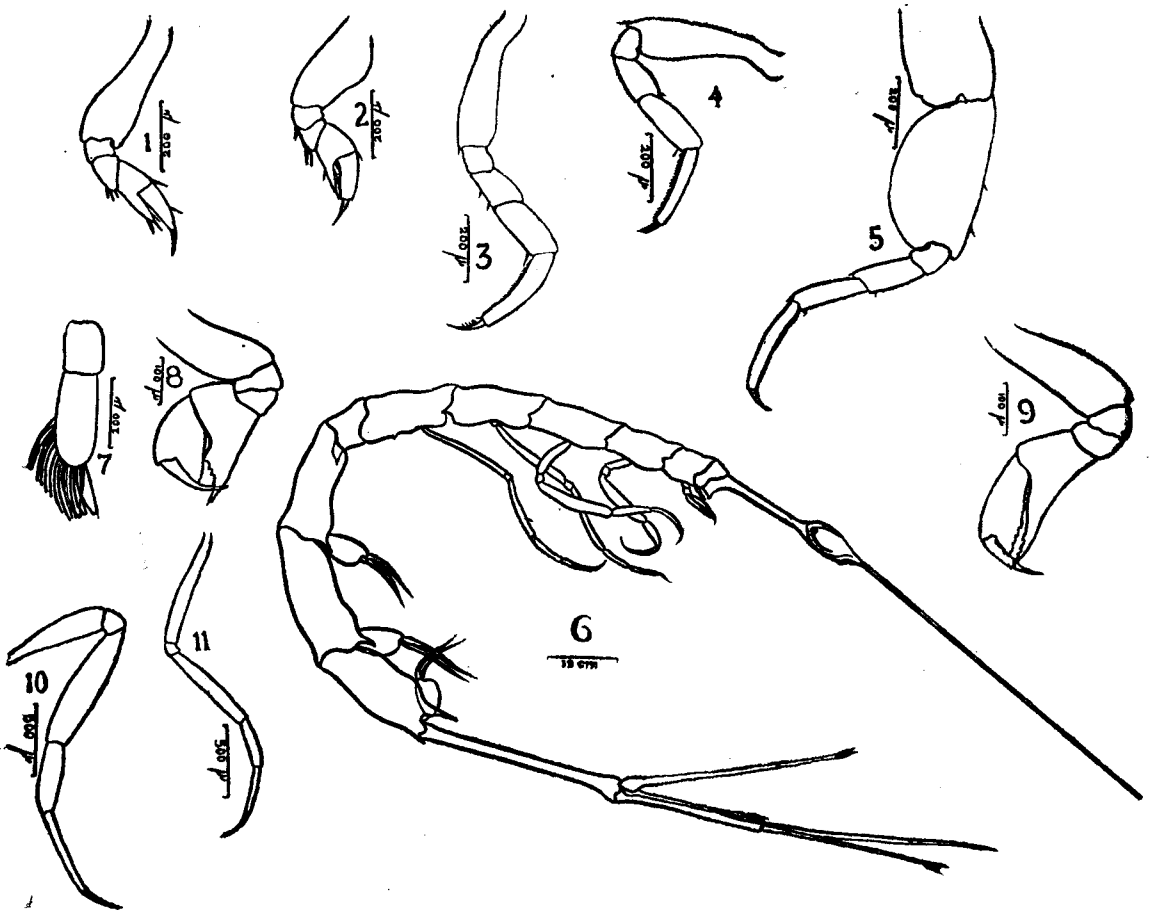
Figs. 1—5. *Male*—

Fig. 1. *Gnathopod* 1.
,, 2. *Gnathopod* 2.
,, 3. *Peraeopod* 1.
,, 4. *Peraeopod* 2.
,, 5. *Peraeopod* 5.

Rhabdosoma armatum (M. Edw.).

Figs. 6–11. *Female*—

Fig. 6. *Rhabdosoma armatum* (side view).
,, 7. *Antenna* 1.
,, 8. *Gnathopod* 1.
,, 9. *Gnathopod* 2.
,, 10. *Peraeopod* 1.
,, 11. *Peraeopod* 3.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